XTRAMUS

NuBAR-1000

User Manual

USM V1.3

Foreword

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REVISION HISTORY

Date	USM Version	History
June, 2009	1.0	First release version
July, 2009	1.1	• Icons of toolbar hotkeys are updated. Please refer to 5.3.2 Toolbar • For Packet Generation Test, the duration configured at software is canceled. Only Time rotary switch on the body of NuBAR-1000 can configure the duration. Please refe to 5.4.1.2 Default User Defined Function B: Packet Generation Test • For user defined Loopback Test, the duration is configured by rotary switch on the body of NuBAR-1000 only. Please refer to 5.4.1.4 Default User Defined Function D: Loopback Test • **Auto** or **Force 10M Full** duplex mode for all network connection • Add caution to user that enough battery power is required for large file download of Web Access test. Please refer to 5.4.1.3 Default User Defined Function C: Web Access
Sep. 2009	1.2	• Add Open Log and Clear Log function in main menu. Please refer to 5.3.1 Operation Menu • Add charge and operation time of battery. Please refer to 6.2.2 Charge and Operation Time of Battery
Aug. 2010	1.3	• Changing format • Revise 6.3. Restriction of Operation

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1. General Description of NuBAR-1000

NuBAR-1000 is an innovative compact network test equipment in the market that constructs several pioneering features that make on-site cabling and analysis for network construction easy and efficient.

Network cabling for a new building or office is often done by third party contractors. The technical personnel may not care about the real throughput and most of contractor only do the simple test by network cable tester to make sure that cable are well arranged and connected. However, problems always happen when the MIS start to deploy the network equipment inside the office. They may find that the cables are either unable to reach the Wirespeed transmission or lots of error packets are received during data transmission.

NuBAR-1000 is an ideal Ethernet tester for testing and troubleshooting potential problems of data transmission and bandwidth in the field. NuBAR-1000 works by pair with roles of Lord and Servant. Without extra standby personnel at the other test site, two NuBAR-1000 negotiate with each other automatically, start bi-directional symmetric / asymmetric Wirespeed transmission, synchronize the test result and store result at Lord NuBAR-1000.

For installation of asymmetric transmission network such as ADSL that downstream speed is much faster than upstream speed, it is difficult to test the network by general loopback method that data transmission speeds between two sides must be the same. Unique Asymmetric Loop Test of NuBAR-1000 is able to do customized speeds asymmetric transmission test that can verify the transmission quality of ADSL for ISP or Telecom Company.
With this affordable price and excellent functions for network probe and test on-site, NuBAR-1000 is comprehensive solution for data transmission test in cable wiring phase or troubleshooting phase in the field.

KEY FEATURES

- Wirespeed gigabit packet generator and analyzer for bi-directional symmetric and asymmetric transmission test
- Packet generation of short, long and random length packet by on-panel operation
- A pair of NuBAR-1000 that serve as Servant and Lord for Bi-directional or Loopback transmission test.
- Mesh Loop function test that forward test streams to up to five NuBAR-1000 in mesh LAN
- Internet connectivity test by accessing and down file from internet.
- Support Layer 1 and Layer 2 loopback
- Five customized test modes on rotary switch that can be configured by PC in advance and operated by on-panel button at test site
- Time based test by rotary time switch or packet counts based test via configuration of utility software
- User-defined packet loss criteria for loopback test to determine Pass/Fail
- Asymmetric network Test such as ADSL without complicate settings.
- Powerful software application for advanced configuration/operation via USB cable
- Built-in rechargeable battery. Conduct tests on-site without extra power source

KEY BENEFITS

- Connect PC is not required for operation of test procedure.
- Test product or network easily without specific expertise.
- Compact and ultra light Gigabit Ethernet test device.
- Built-in rechargeable NI-MH battery for testing of Ethernet anywhere.
- 10 pre-defined test patterns, and 5 user-defined patterns for instant testing or customized application.
- Test Ethernet network by two NuBAR-1000 that is located far away from each other.
- Auto-negotiation along with bi-directional Symmetric/Asymmetric Wirespeed test or loopback test to measure the network.

MAIN APPLICATIONS

- Network Detecting in Research and Development
- On-site test/repair/ maintenance of network in telecommunication and cable wiring business
- Network wiring task and trouble-shooting in office or building
- Asymmetric transmission test such as ADSL
- Test connection status of Internet
- Solution of Last-mile test between CO (central office) and CPE (customer premises equipment)
- Integrated test solution for customized proposal.

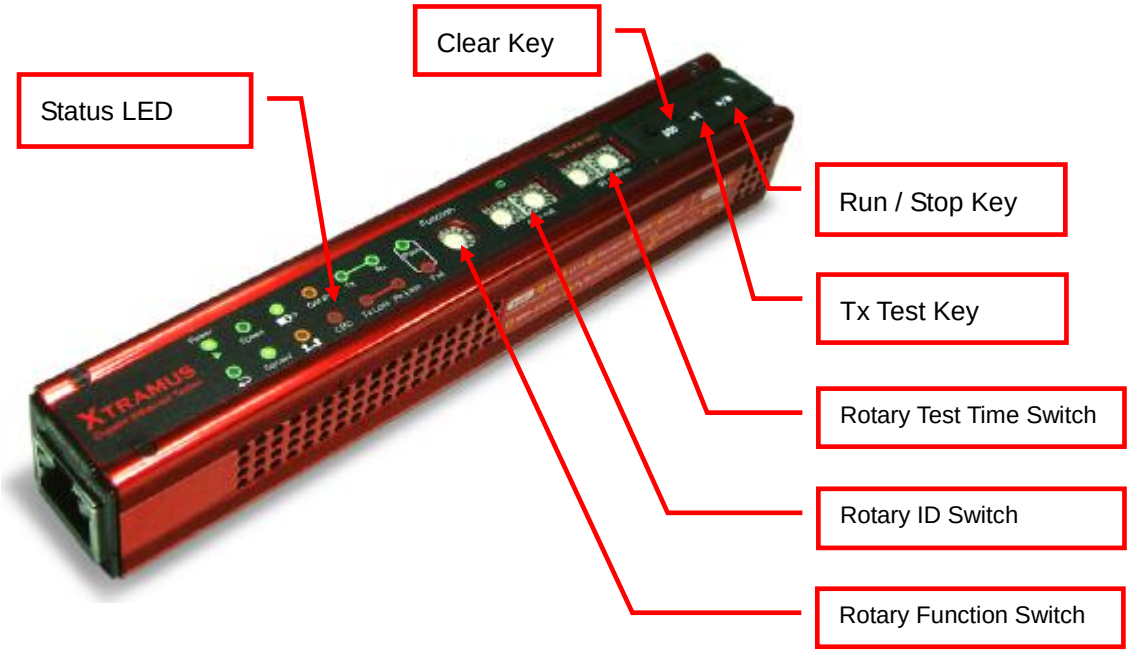
2. Appearance

2.1 Front Side

There is a model name of this device.

2.2 Rear Side

Operation buttons and LED indicators are located here.



Status LED

Type	Label	LED	Description
System	Power (Run)	ON	System is ready
		Blinking	System is running the specified task
		OFF	Power is off
Battery		ON	Battery is almost exhausted. Please connect USB cable to charge it.
Test result	CRC	ON	CRC Error is found during the test
		Blinking	Keep blinking if CRC error packets are received continually.
	Tx loss	ON	Packet loss is found from local to remote side during the test.
	Rx loss	ON	Packet loss is found at receiving side from remote to local side during the test.
	Fail	ON	Result of the test is failed.
	Pass	ON	Result of the test is passed.
Functional Status	(Loopback)	ON	Loopback status is enabled. Rotate functional rotary switch to 8 or 9 mode to enable this status
		OFF	Under normal Lord or Servant mode.
	Servant	ON	This device is under Servant Mode. Rotate functional rotary switch to this mode.
		OFF	This device is under Lord Mode.
	(Connect)	ON	Negotiation and connection between Lord unit and Servant unit is successful.
		Slow blinking (1Hz)	Request connection to Lord unit or Servant unit. If the unit is under Lord mode, then it request connection to Servant, and vice versa.
		Fast blinking (8Hz)	Request connection between Lord unit and Servant unit is failed.
	Get IP	ON	Test the connection to Internet is successful.

		Slow blinking (1Hz)	Try to get an IP address from DHCP
Transmission Status	TX	Slow blinking (2Hz)	Data is transmitting
		Fast blinking (4Hz)	Transmitting in Wirespeed
	RX	Slow blinking (2Hz)	Data is receiving
		Fast blinking (4Hz)	Receiving in Wirespeed
	Speed	ON	1000Mbps connection
		Mild blinking (2Hz)	100Mbps connection
		Slow blinking (1Hz)	10Mbps connection

Rotary Switch

Label	Scale	Description
Function	1 set 16 scales 0~9, A~F	16 function modes 0~9: Pre-defined function A~E: Customized settings F: Control by PC via mini-USB port of NuBAR-1000. For detail, please refer to 3.1.1 Rotary Function Switch
ID	2 sets 16 scales 0~9, A~F	Pair mapping control of NuBAR-1000 if there are more then one pair of NuBAR-1000 connected in the same network. For detail, please refer to 3.1.2 ID Rotary Switch
Test Time (sec)	2 sets 16 scales 0~9, A~F	It is for the configuration of test duration each time. Duration in seconds is configured in hex mode. For detail, please refer to 3.1.3 Test Time Rotary Switch

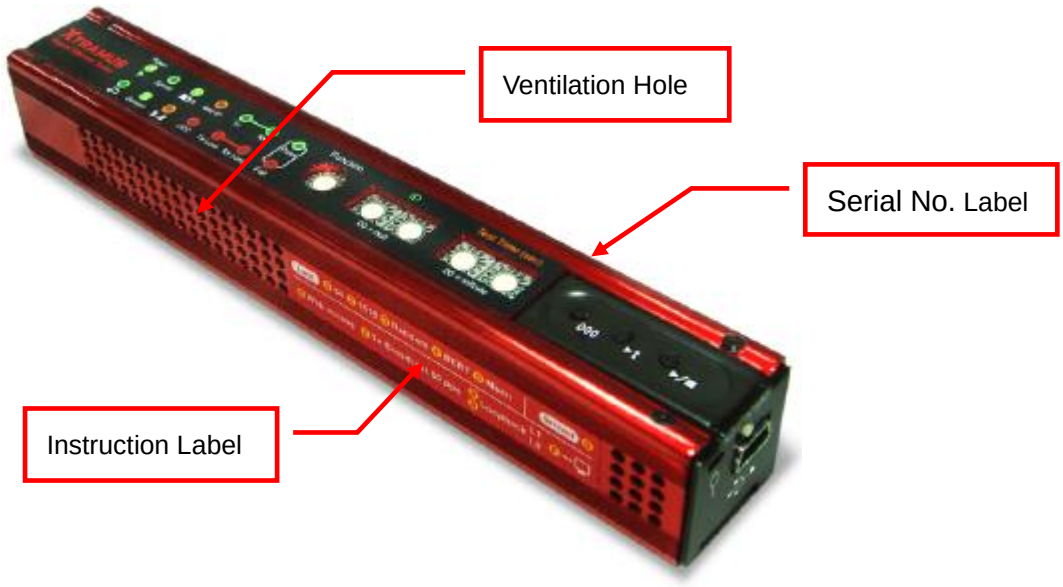
Buttons

Label	Action	Description
▶/■	Push once	Run / Stop Key Press it to start or stop the procedure configured in Rotary Function Switch.

▶t	Push once	Tx Test Key Transmit 10 broadcast short packet by 2 different MAC address. One MAC address is for the transmission of management parameter and the other is for the test packets.
000	Push once	Clear Key Clear the test result for next test. When test is done, all LEDs keep the result of pervious test. Press this key to clear all test results, then operator is able to process next test.

2.3 Top Side and Bottom Side

Ventilation hole, instruction label for rotary function key and Serial No. label are located here.



2.4 Left side

Left side has UTP ports that connect with physical transmission media.

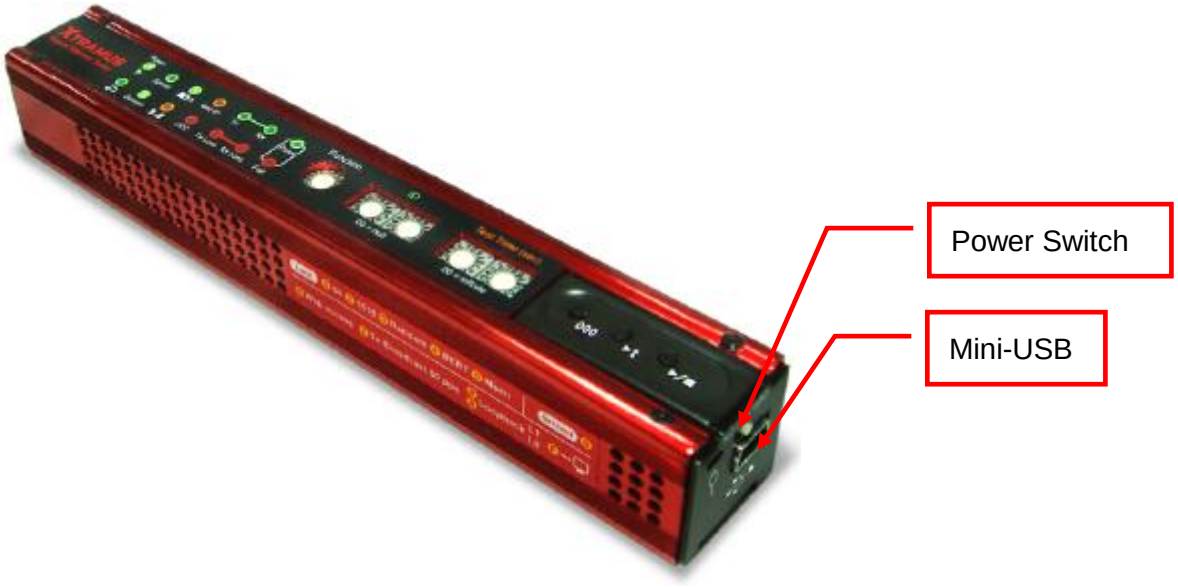
Connection Ports

Port Type	Label	Description
UTP Ethernet port for RJ-45 connector	10 100 1000M	Ethernet port for 10/100/1000M speed connection of RJ-45 connector

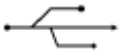
Status LED

Type	Label	LED	Description
UTP Port status for RJ-45 connector	Link/ACT	ON	Network is linked up.
		Blinking	Data is transmitting or receiving
	Full	ON	Full duplex connection
		OFF	Half duplex connection

2.5 Right Side



Connection Ports

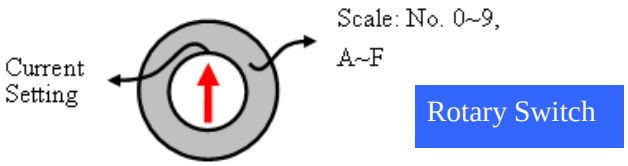
Type	Label	Description
Mini-USB		Power supply, battery charge, remote control and configuration or Firmware/FPGA upgrade of this machine
Power Switch	OFF ON	Turn on or turn off the operation of NuBAR-1000. Powered USB cable keep charging the battery of NuBAR-1000 even though the power switch is OFF.

3. Function of Rotary Switch and Buttons

At the bottom of this machine, there are rotary switches and buttons for almost all operation of this machine. Rotary switches are for the configuration of this machine and buttons are for the operation of this machine.

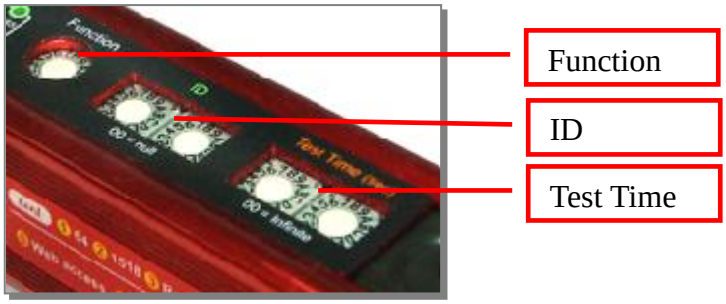
3.1 Rotary Switches for Configuration

There are several 16 scales rotary switches, scales from 0 to 9, A to F for 16 functions.



Use ceramics screwdriver that comes with NuBAR-1000 package to rotate this switch for the function below:

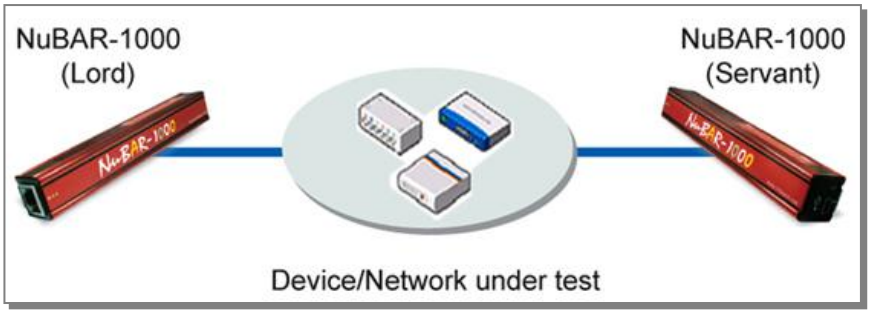
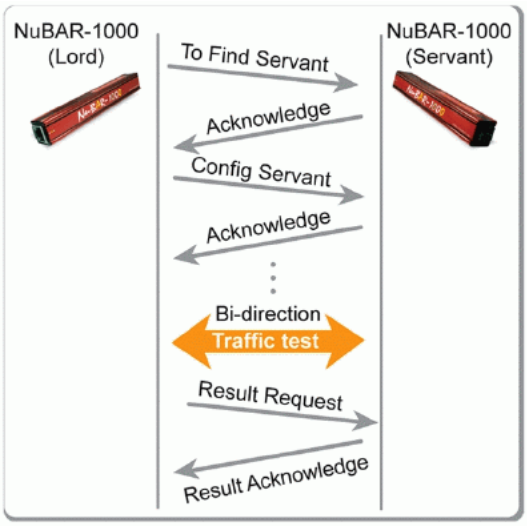
As the description at few sections above, the table is the general description of rotary switch

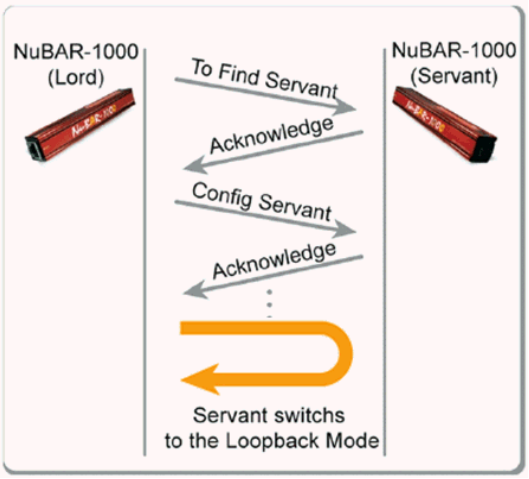
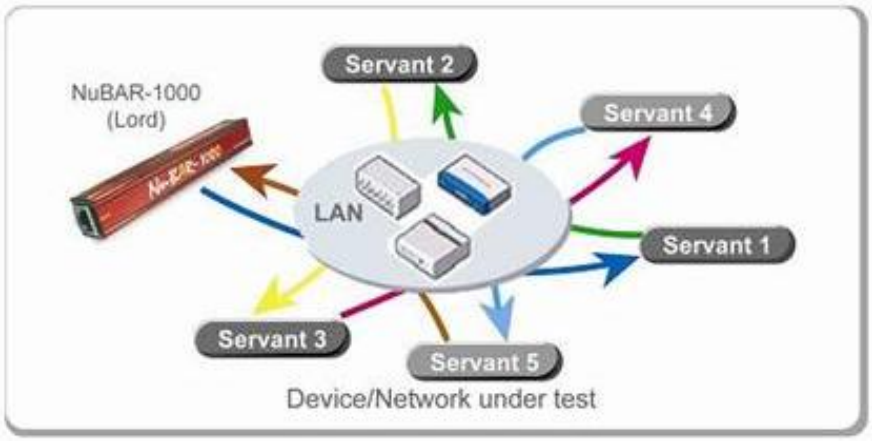


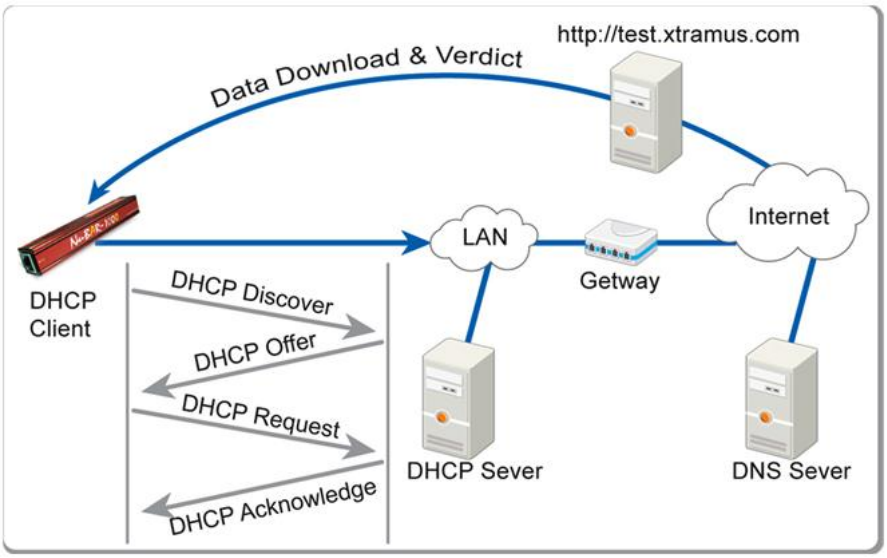
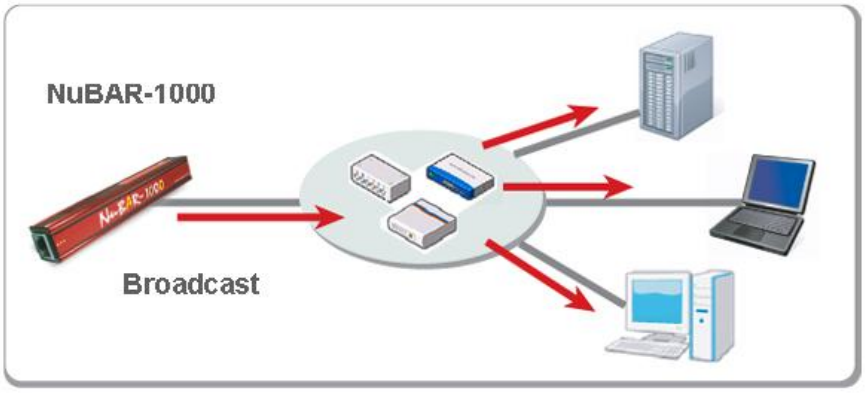
Label	Scale	Description
Function	1 set 16 scales 0~9, A~F	16 function modes 0~9: Pre-defined function A~E: Customized settings F: Control by PC via USB port.
ID	2 sets 16 scales 0~9, A~F	Pair mapping control of NuBAR-1000 if there are more then one pair of NuBAR-1000 connected in the same network.
Test Time (sec)	2 sets 16 scales 0~9, A~F	It is for the configuration of test duration each time. Duration in seconds is configured in hex mode.

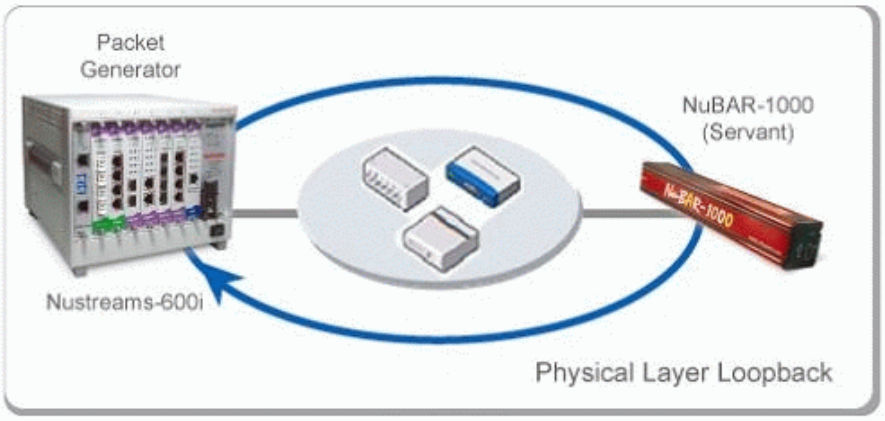
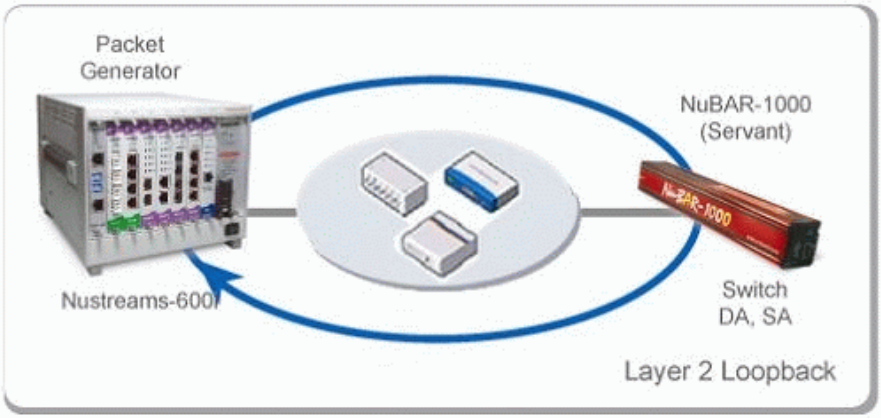
3.1.1 Rotary Function Switch

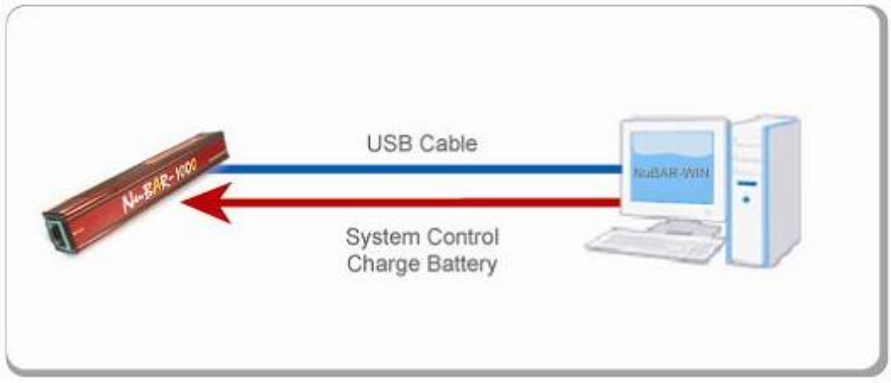
There is one 16 scales Functional Rotary Switch for 16 functions

Scale	Function name	Description
0	Servant mode	Switch to Servant mode and accepts control and test from Lord. LED of Servant is ON when this mode is activated. 
1	Short Packet Test	Lord requests Servant for symmetrical and bi-directional Wirespeed short packets (64 bytes) test. Lord and Servant do negotiation first, start test, synchronize result with each other, and then show test result when test is done. Pass LED is ON if no CRC errors, packet loss errors and other errors are found, otherwise, it is failed.  **Rotary function switch location** ➢ Lord NuBAR-1000: 1 ➢ Servant NuBAR-1000: 0
2	Long Packet Test	Same test as function 1 with long packets length (1518 bytes). **Rotary function switch location** ➢ Lord NuBAR-1000: 2 ➢ Servant NuBAR-1000: 0
3	Random Packet Test	Same test as function 1 with random length packets (64~1518 bytes). **Rotary function switch location** ➢ Lord NuBAR-1000: 3 ➢ Servant NuBAR-1000: 0

4	BERT Loopback Test	Lord sends BERT (Bit Error Rate Test) pattern (long packets, PRBS 2^31-1) to Servant and returns with switched DA / SA (destination / source MAC address) and recalculated CRC for Loopback test.  **Rotary function switch location** ➢ Lord NuBAR-1000: 4 ➢ Servant NuBAR-1000: 0
5	Mesh Loop Test	Lord send mesh connection request to all Servants. There are maximum 5 Servants for this mesh connection test. Then Lord sends test packets to the 1st Servant, then the 1st Servant forward packets to 2nd Servant. Procedure is repeated until the final Servant returns packets to Lord. When test is done, all of them synchronize the result.  **Rotary function switch location** ➢ Lord NuBAR-1000: 5 ➢ Servant NuBAR-1000: 0. The sequnece of acknowledge from servants decides the sequence of servant.
6	Web Access	Get IP from DHCP server in the LAN and then access web server in Internet to download a specified file from Internet for test purpose.

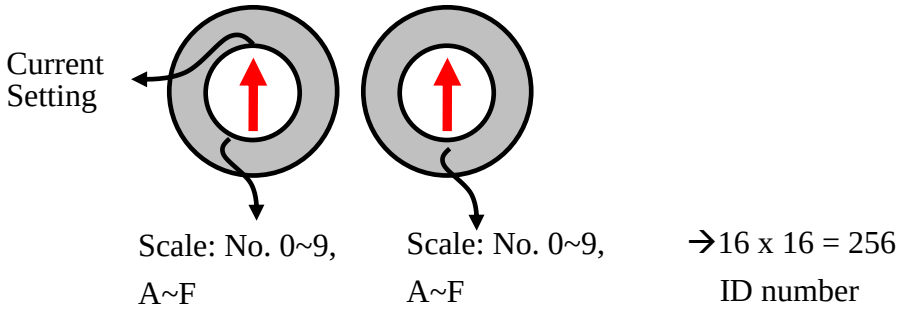
		 **Rotary function switch location** ➢ NuBAR-1000: 6
7	Transmit Broadcast Packet 60pps	Send broadcast packets 60 times per second with increasing packet length (64~1518, 64...).  There is no test result and termination for the test. **Rotary function switch location** ➢ NuBAR-1000: 7
8	Loopback Slave (layer1)	This mode is test for other non-NuBAR-1000 device (Packet Generator). NuBAR-1000 resend incoming test frames from other non-NuBAR-1000 device to its received port.

		 There is no test result and termination for the test. **Rotary function switch location** Servant NuBAR-1000: 8
9	Loopback Slave (layer2)	This mode is test for other non-NuBAR-1000 device (Packet Generator). NuBAR-1000 resend incoming test frames from other non-NuBAR-1000 device to its received port with switched DA / SA (destination / source MAC address) and recalculated CRC.  There is no test result and termination for the test. **Rotary function switch location** ➢ Servant NuBAR-1000: 9
A~E	Customized settings	Customized test settings that can be configured by PC via USB port. There are pre-configured default settings for other test. Please refer to **Rotary function switch location** ➢ Lord NuBAR-1000: A~E ➢ Servant NuBAR-1000: 0
F	PC control	Remote control, configuration and firmware/FPGA update by NuBAR-WIN application software via USB port.

		 Note: NuBAR-1000 can be charged by PC or external power adaptor in any Function Modes. **Rotary function switch location** ➢ Lord NuBAR-1000: F ➢ Servant NuBAR-1000: Accepts control from Lord NuBAR-1000. Set it to Servant mode and configuration is not required.

3.1.2 ID Rotary Switch

There are two 16 scales ID Rotary Switch for mapping of Lord and Servant

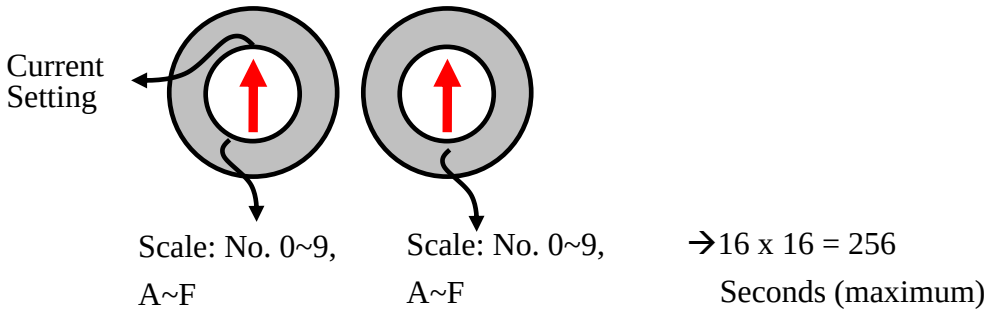


- NuBAR-1000 with the same ID, which the two ID rotary switches are identical the same, works as a pair (Lord and Servant)
- If the mapping duration exceeds 20 seconds without successful connection, the connection procedure is suspended.
- Set it to "0", means Lord accepts any reply from Servant if NuBAR-1000 is in Lord mode.
- Set it to "0", means Servant replies any request from Lord if NuBAR-1000 is in Servant mode.
- Unless switching the rotary switch for a pair of NuBAR-1000 to different ID, the pair of NuBAR-1000 keeps working together even though there is a new added NuBAR-1000 with the same ID exists in the same network.
- Lord and Servant works as pair that is based on MAC address. One NuBAR-1000 uses 2

MAC address, one is for transmission of test data and the other is for negotiation and communication. DUT/NUT has to register totally 4 MAC addresses in its MAC address table for a pair of NuBAR-1000.

3.1.3 Test Time Rotary Switch

There are two 16 scales Test Time Rotary Switch for configuration of duration for each test.

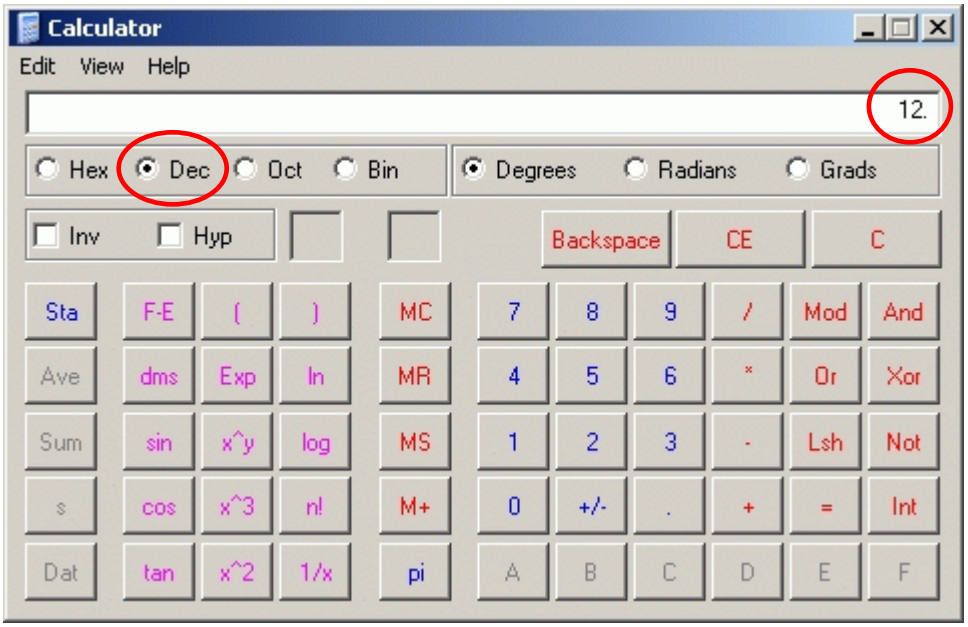


It is for the configuration of test duration each time. Duration in seconds is configured in 2 hex mode rotary switches.

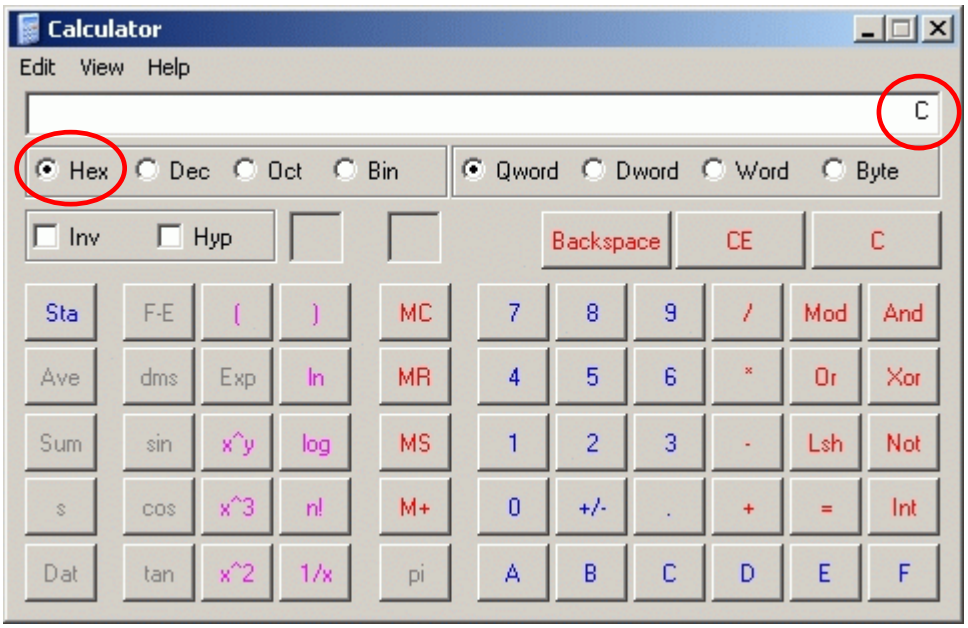
16 scales rotary switch: 0~9, A = 10, B = 11. C = 12, D = 13, E=14, F=15

User can calculate the result from Windows calculator (Start → Programs → Accessories → Calculator). For example, 12 seconds

Input 12 in Decimal mode


Calculator
Edit View Help
12.
Hex Dec Oct Bin
Degrees Radians Grads
Inv Hyp
Backspace CE C
Sta F-E ( ) MC 7 8 9 / Mod And
Ave dms Exp ln MR 4 5 6 * Or Xor
Sum sin x^y log MS 1 2 3 - Lsh Not
s cos x^3 n! M+ 0 +/- . + = Int
Dat tan x^2 1/x pi A B C D E F

Then click Hexadecimal, then the answer is C. Rotate the switch to "0" "C" for duration of 12 seconds

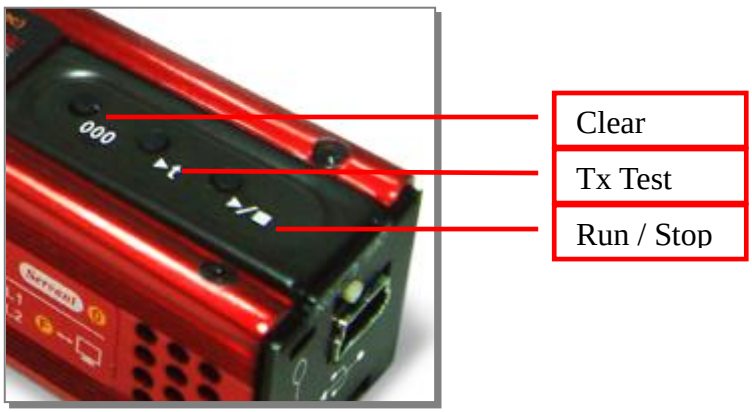

Calculator
Edit View Help
C
Hex Dec Oct Bin
Qword Dword Word Byte
Inv Hyp
Backspace CE C
Sta F-E ( ) MC 7 8 9 / Mod And
Ave dms Exp ln MR 4 5 6 * Or Xor
Sum sin x^y log MS 1 2 3 - Lsh Not
s cos x^3 n! M+ 0 +/- . + = Int
Dat tan x^2 1/x pi A B C D E F

When user clicks Start / Run button to start the test, the NuBAR-1000 stops automatically for a moment later, owing to the test duration configured here. If test duration is configured, wait result until the test is done. Press Stop button to stop the test immediately will cause a fail test.

If it is configured to "0", the test keeps going continually, unless user press Stop button to stop the test.

3.2 Button for Operation

There are 3 buttons for the operation of NuBAR-1000. When configuration via rotary switch is done, press these buttons to operate the function for the test.



3.2.1 Run / Stop button

Press it to start the procedure configured in Rotary Function Switch. The procedure will stop automatically, owing to the internal settings of the procedure or the duration configured at Rotary Test Duration Switch.
Force to stop the procedure by pressing it again. For most of test procedures, they will stop automatically. Force to stop these tests probably cause failed result.

3.2.2 Clear Key

Clear the current test result for next test. When test is done, all LEDs keep the result of pervious test. Press this key to clear all test results, then operator is able to process next test.

3.2.3 Tx Test Key

Transmit 10 broadcast short packets by 2 different MAC address One MAC address is for the transmission of management parameter and the other MAC address is for the test packets.

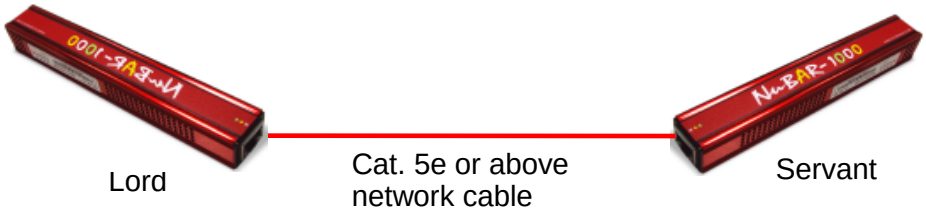
4. Procedure of Operation

This chapter tells user how to use NuBAR-1000 in your test site.

4.1 Hardware Connection

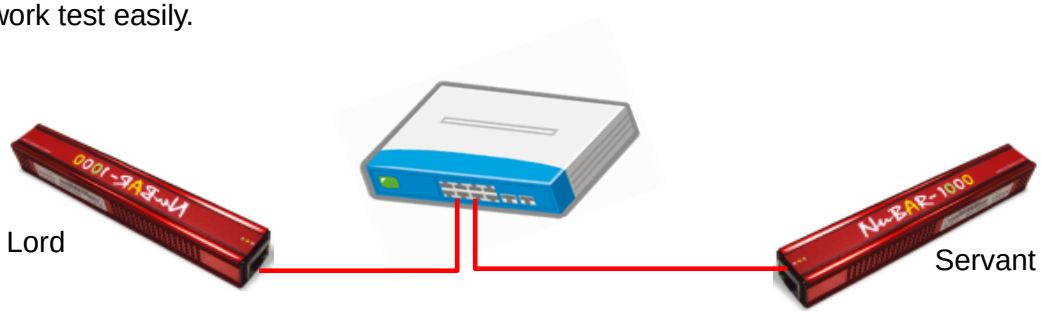
4.1.1 For Self-Test

Before the real test, operator can connect the two devices directly by network cable (Cat. 5e or above is suggested) for functional check.



4.1.2 For Single DUT

Without high cost desktop test equipment, the compact size NuBAR-1000 is able to do Ethernet network test easily.



The test streams run through the two ports that join the test. If there are more than two port that need to join the test simultaneously, other advanced model can fit user's requirement. Please contact with distributor of Xtramus.

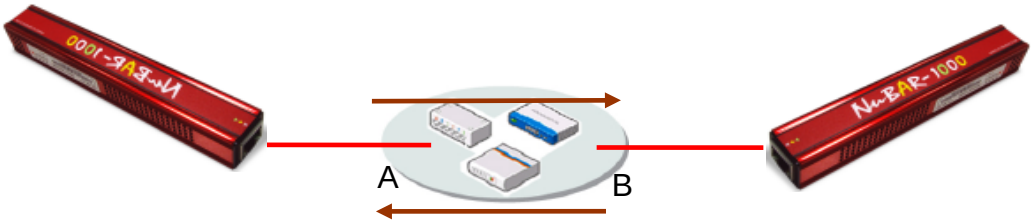
4.1.3 For Cable Wiring

To wiring a network cable in office or building, NuBAR-1000 is convenient for data transmission test. Do this test to insure the transmission quality for real environment. To test the cable inside the building, connect two sides of the cable to a pair of NuBAR-1000. If the test is passed, it also performs well in real condition by real network device.

4.1.4 For Network Infrastructure

To test the transmission quality between two network locations that is connected by multiple network equipments such as Ethernet Switches, Network Server, connect two ends of the network device to a pair of NuBAR-1000. The figure below illustrates the transmission test between location A and B.

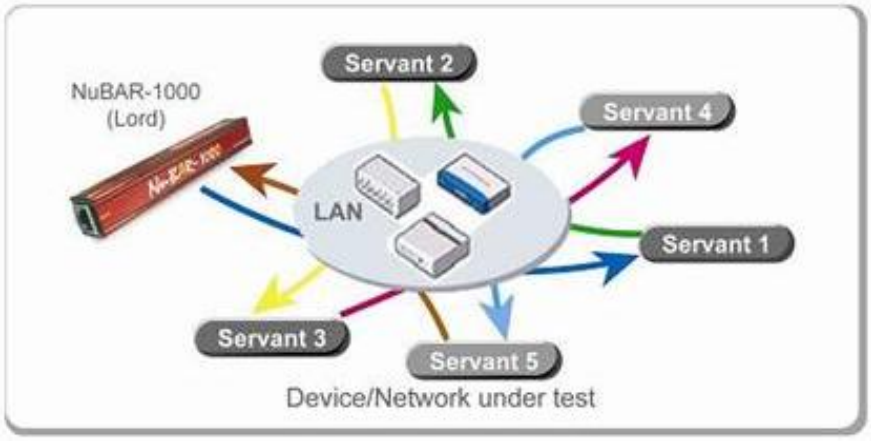
Note: NuBAR-1000 is test equipment of layer 2 packet. Devices that can not forward layer 2 (MAC based) packet are not suitable for the test. Network such as Internet runs layer 3 protocols is not suitable for the test. It is applicable for ADSL test for cable wiring business. The connection between CO (central office) and the CPE (ADSL modem) apply layer 2 Ethernet.



4.1.5 For Mesh Network

As the rotary function switch introduced above, NuBAR-1000 is able to do mesh connection test. Lord sends test packets to the 1st Servant, then the 1st Servant forward packets to 2nd Servant. Repeat the procedure until the packets returns to Lord finally.

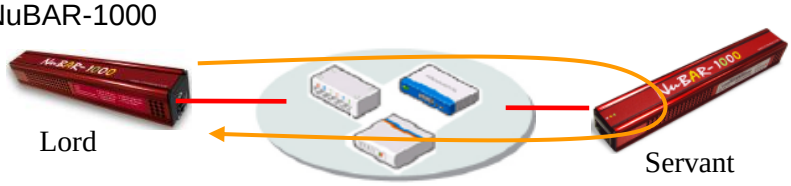
The application below applies to six locations of network infrastructure.



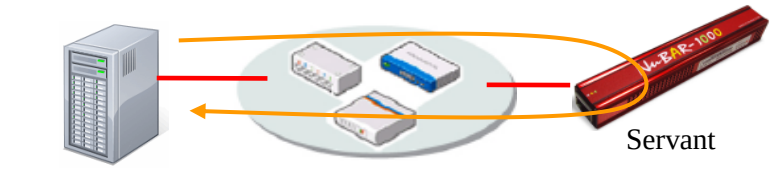
4.1.6 For Loopback Test

The Loopback test for NuBAR-1000 can be divided into 2 kinds. One is the loopback test by a pair of NuBAR-1000 and the other is loopback test with other network device (packet generator).

By a pair of NuBAR-1000

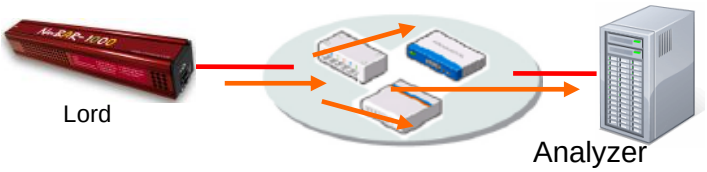


Work with other network device (packet generator)



4.1.7 For Broadcast Test

There is no test result for broadcast test. Operator can install other network analyzer to monitor or count the broadcast packets for test purpose.



4.2 Test Procedure

4.2.1 Configure the Function Mode

- Select function mode

To use the NuBAR-1000, select the test mode what you need. Please refer to 3.1.1 Rotary Function Switch

To do the test by pair, the rotary function switch for Lord and Servant is different.

For short packet test

Lord NuBAR-1000

Servant NuBAR-1000

- Select the same ID for a pair of NuBAR-1000

For a test that is work by a pair of NuBAR-1000, the ID number of the two NuBAR-1000 has to be the same. The default ID of NuBAR-1000 is "00". , means Lord accepts any reply from Servant if NuBAR-1000 is in Lord mode and Servant replies any request from Lord if NuBAR-1000 is in Servant mode.

Rotate two ID rotary switches to other value, such as "01" for two NuBAR-1000.

Lord NuBAR-1000

Servant NuBAR-1000

- Configure the test duration for a single test

Test duration is configured by hexadecimal mode that is described at 3.1.3 Test Time Rotary Switch

For 1 minutes (60 seconds) test

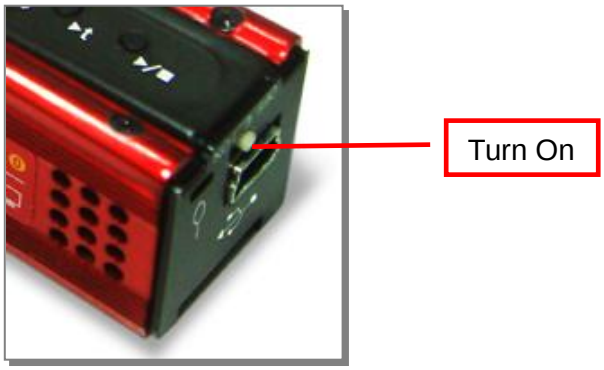
Lord NuBAR-1000

Configuration for Servant NuBAR-1000 is not required

Servant NuBAR-1000

4.2.2 Start the Test Procedure

- Power ON both Lord and Servant NuBAR-1000 from power switch.

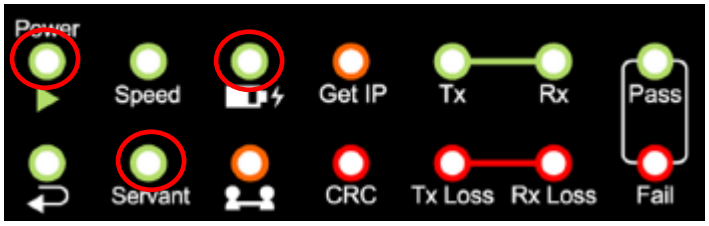


Note: To fit the compact size of the NuBAR-1000, the power switch is tiny. To prevent damage of this switch, please slide the switch carefully or push it via the attached ceramic screwdriver.

- Check the system status before starting test.

In normal condition, **Power**, **Servant** is ON and **Battery** is blinking if charging is processing.

Note: To operate different function mode via Functional Rotary Switch, the role of NuBAR-1000 become **Lord**. Then the **Servant** LED is OFF and **Lord** mode is activated.

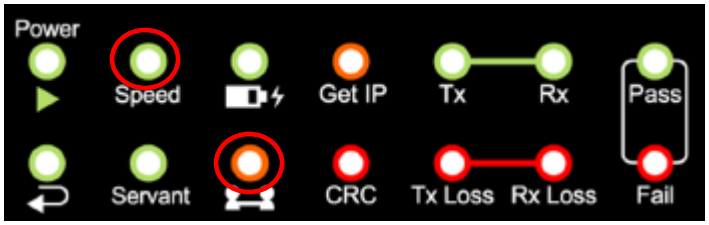


- Connect hardware with network cable

Connect the network cable depending on the different test scenario as described in 4.1 Hardware Connection

- Connect a pair of NuBAR-1000

Press the **Tx Test** button to test the network. Speed is ON (ON: 1000Mbps connection; Mild blinking (2Hz): 100Mbps connection; Slow blinking (1Hz): 10Mbps connection)



- Start Test

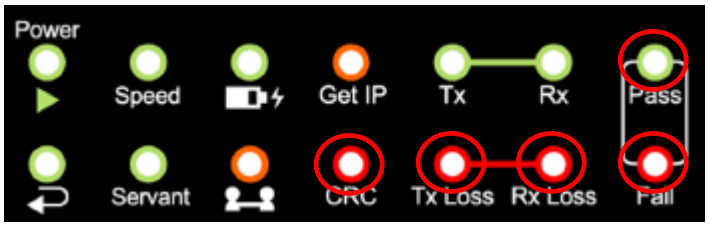
Press the **Run / Stop** button to start the test, (connect) is ON and wait for the stop automatically.

4.3 Test Result

The result of the test is shown on the LED indicator instantly.

Type	**Label**	**LED**	**Description**
Test result	CRC	ON	CRC Error is found during the test
		Blinking	Keep blinking if CRC error packets are received continually.
	Tx loss	ON	Packet loss is found when test stream is transmitted from local side to remote side during the test
	Rx loss	ON	Packet loss is found when test stream is received from remote side to local side during the test.
	Fail	ON	Result of the test is failed.

	Pass	ON	Result of the test is passed.



Detail result and counter can be knows via the NuBAR-WIN application software. Please refer to 5 Remote Control from USB Port

5. Remote Control from USB Port

NuBAR-1000 series come with a Windows GUI (graphic user interface) application software, NuBAR-WIN that is running at PC for controlling of this machine. Operator can operate this machine via USB port, collect statistic counter and do system upgrade.

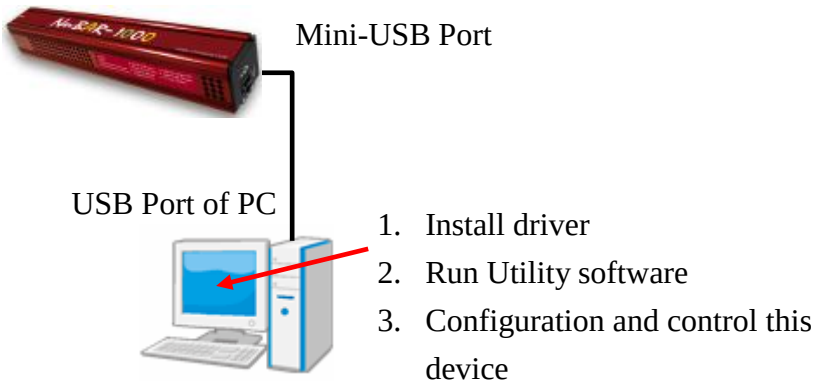
	Basic System Requirement for NuBAR-1000 application software	
	Windows XP	**Windows Vista**
CPU	800MHz CPU	1.6 GHz, 32 bits (x86) CPU
RAM	256MB RAM	1GB RAM
HDD	20MB available space (available space means the space for installation and operation)	20MB available space (available space means the space for installation and operation)

USB cable with mini-USB connector comes with the package of this machine. If operator does not have this cable, it is possible to purchase it from local electronic store. It is an industrial standard cable with standard male USB connector and standard male mini-USB connector at each side.

5.1 Installation of Driver

To active the USB connection, install driver for NuBAR-1000 series is required
The procedure below shows the installation of driver

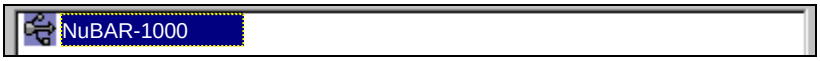
1. Power On the machine
2. Connect USB cable to both PC and mini-USB port of NuBAR-1000



3. Windows will prompt you that new USB device is found and it needs driver. Manual select the driver location at the folder ..**\NuBAR-1000 driver** which operator gets it from Xtramus. Follow the instruction of Windows to finish the installation.

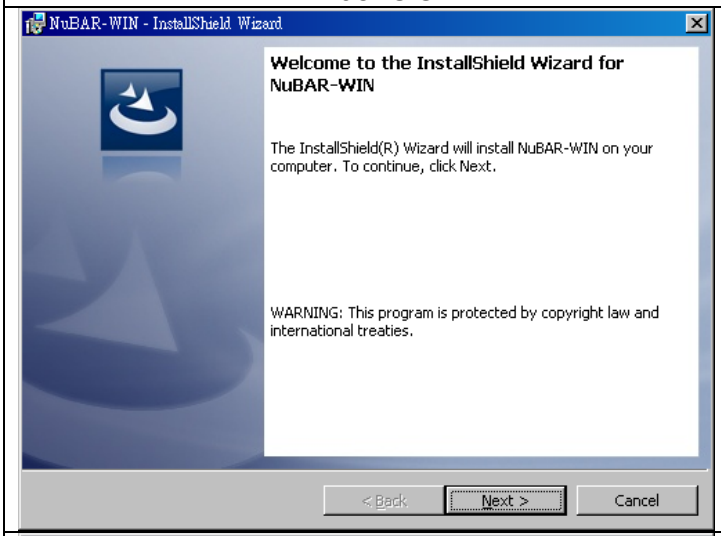
4. If driver is installed correctly, when you click icon at right-bottom corner of Windows task

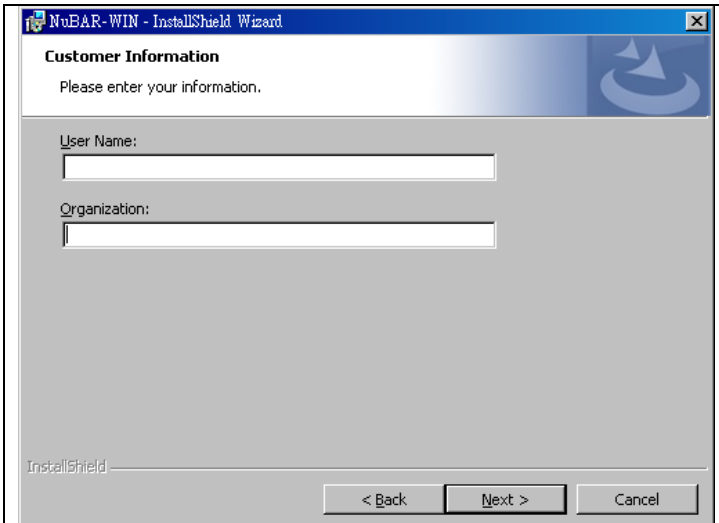
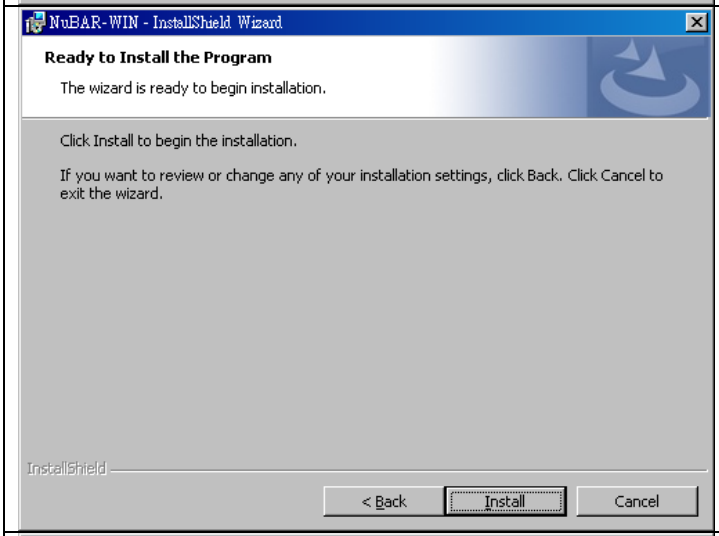
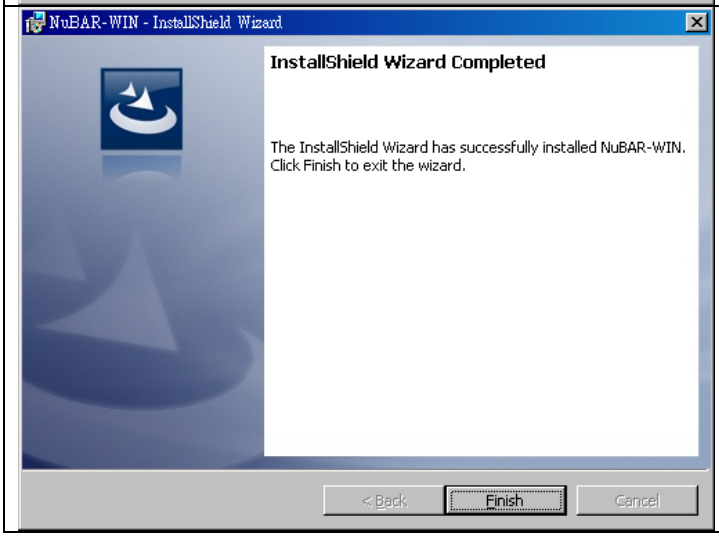
bar, it shows NuBAR-1000 device



5.2 Installation of Software Utility

Click to run the .EXE utility execution file provided by Xtramus to install the software. System shows

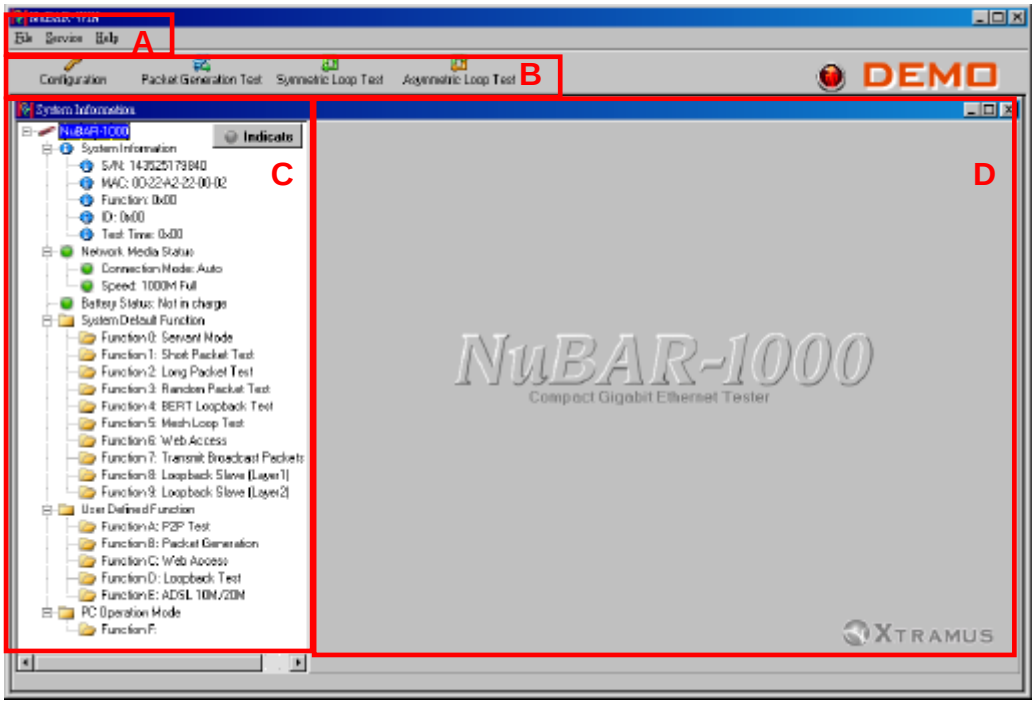
Windows UI	Description
	Welcome to install NuBAR-1000 Utility. Please click **Next** button to continue
	License Agreement for End User. Click **I accept the terms in the license agreement**, and then click **Next**

	Input **User Name** and **Organization** and click **Anyone who uses this computer (all users)** and **Next**
	Confirm the message for installation. Click **Install** to start installation procedure
	Click **Finish** to close the installation procedure

When Installation is done, start the program by clicking Start → All Programs → Xtramus → NuBAR-1000 → NuBAR-WIN vx.xxxxx → NuBAR-WIN vx.xxxxx (x is version number) or

at desktop, then main windows is shown.

5.3 Operation of Main Window

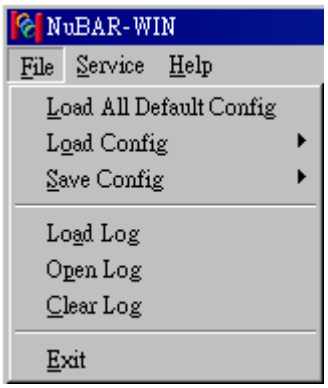


The block **A**, **B**, **C**, **D** is used for the successive sections. For the detail of each block, please read the sections below.

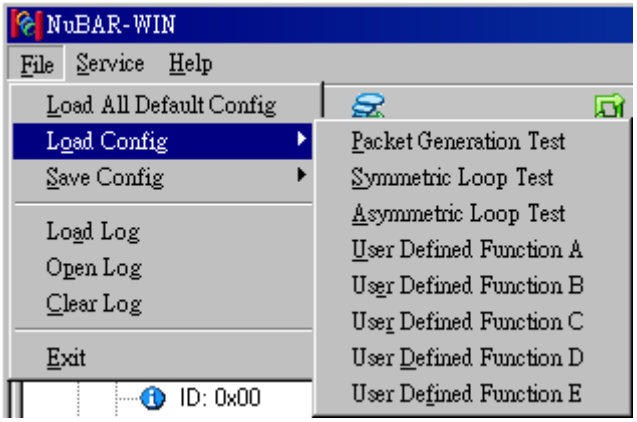
5.3.1 Operation Menu

Block in main window: **A**

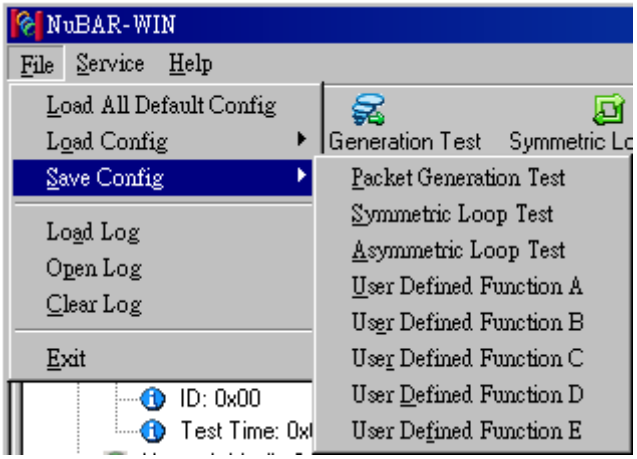
- File sub-menu Program Files→ Xtramus → NuBAR-1000\ NuBAR-WIN vx.xxxxx\TestLog



Menu Choice	Usage
Load Default Config	Load default setting and clear all configurations that is done by users.
Load Config	Select folder, filename and load configuration file that is saved previously. The configuration is classified as the categories below.

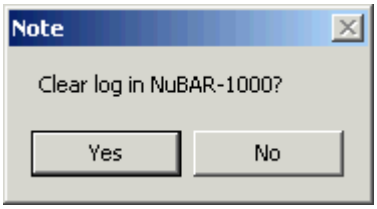
<table>
<tr>
<td></td>
<td>


Packet Generation Test
Load configuration file of Packet Generation Test. For Packet Generation Test, please refer to 5.4.2 Packet Generation
Symmetric Loop Test
Load configuration file of Symmetric Loop Test. For Symmetric Loop Test, please refer to 5.4.3 Symmetric Loop Test
Asymmetric Loop Test
Load configuration file of Asymmetric Loop Test. For Asymmetric Loop Test, please refer to 5.4.4 Asymmetric Loop Test
User Defined Function A
Load configuration file of User Defined Function A. For User Defined Function A~E, please refer to 5.4.1 Configuration
User Defined Function B~E is same as above

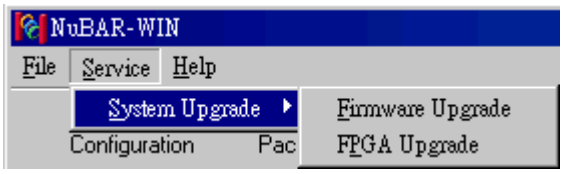
</td>
</tr>
<tr>
<td>Save Config</td>
<td>Select folder, save configuration filename in specified folder. The configuration file is classified as the categories below.


Packet Generation Test
Save configuration file of Packet Generation Test. Default folder is located at C:\Program Files\Xtramus\NuBAR-1000\NuBAR-WIN Vx.xx...\Config\PGTest
Symmetric Loop Test
Save configuration file of Symmetric Loop Test. Default folder is located at

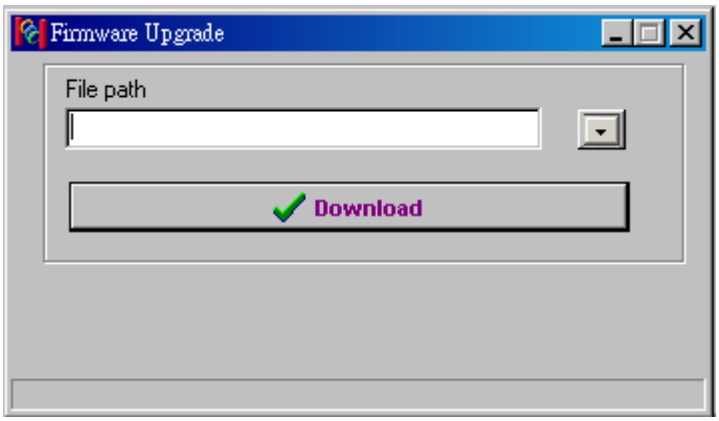
</td>
</tr>
</table>

	C:\Program Files\Xtramus\NuBAR-1000\NuBAR-WIN Vx.xx...\Config\SymLoopTest • Asymmetric Loop Test Save configuration file of Asymmetric Loop Test. Default folder is located at C:\Program Files\Xtramus\NuBAR-1000\NuBAR-WIN Vx.xx...\Config\AsyLoopTest • User Defined Function A Save configuration file of User Defined Function A. Default folder is located at C:\Program Files\Xtramus\NuBAR-1000\NuBAR-WIN Vx.xx...\Config\UDF_A • User Defined Function B~E is same as above that the folder name is UDF_B ~ UDF_E
Load Log	• Load test logs from built-in memory of NuBAR-1000. These test logs is saved for test without PC.
Open Log	Open the saved logs that is loaded from NuBAR-1000
Clear Log	Clear the logs in the built-in memory of NuBAR-1000. System will prompt you before clearing the log. 
Exit	Exit and close this utility

- Service sub-menu

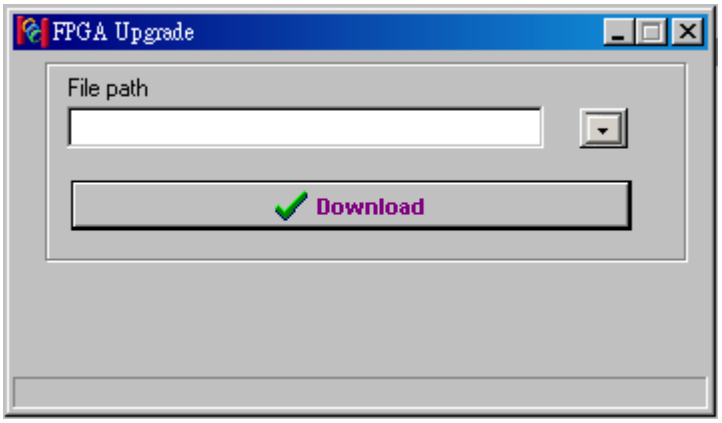


Menu Choice	Usage
System Upgrade	Do system upgrade for Firmware: Firmware in NuBAR-1000 device. Select file from folder and click download button.



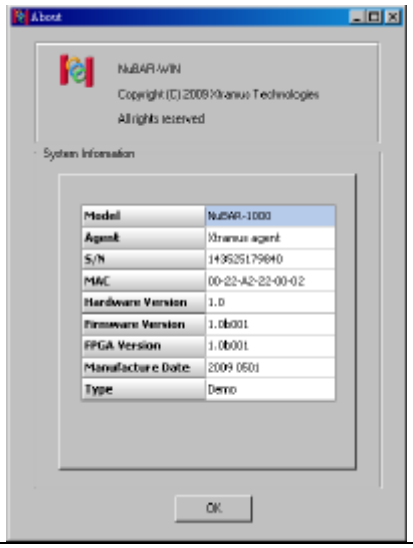
FPGA: (Field Programmable Gate Array) chip in NuBAR-1000 device

Select file from folder and click download button.



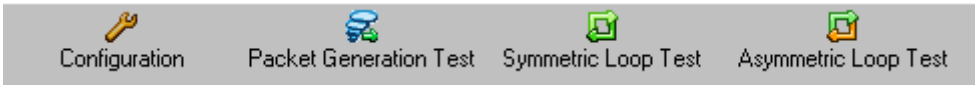
- Help sub-menu

Menu Choice	Usage
About	System information, such as Utility version and Hardware version of NuBAR-1000 device

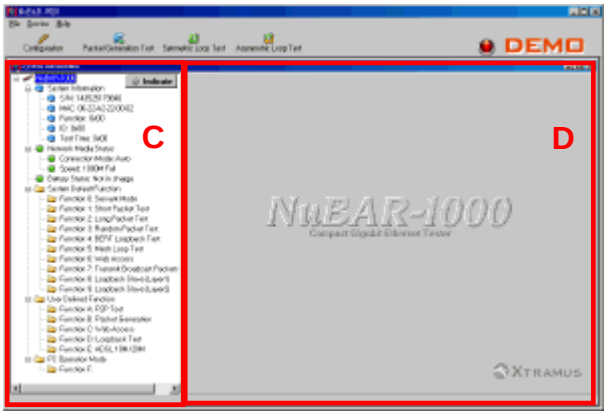
	
Help	Open user manual or other help information.

5.3.2 Toolbar

Block in main window: **B**



E **F** **G** **H**

Keys	Usage
E: Configuration	Click it to Show System information at **C** block and all illustration graph or configurable items at **D** block. Click its sub tree in **C** to enter the window of detail configuration. 
F: Packet Generation	Configure packet generation parameter. The destination can be a specified MAC, broadcast or the NuBAR-1000 itself.
G: Symmetric Loop Test	Configure symmetrical and bi-directional loop test. It has to work by a pair of NuBAR-1000. The test is suitable for LAN network test.

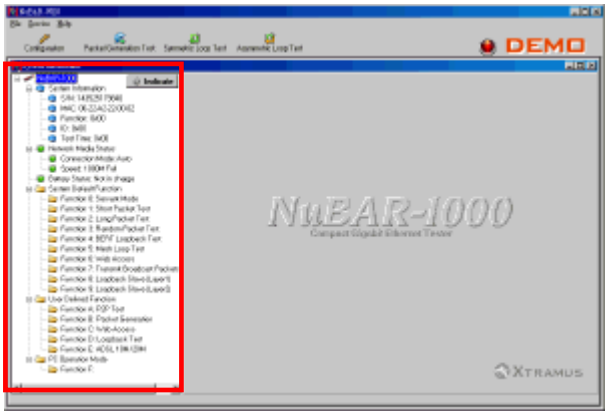
H: Asymmetric Loop Test	Configure asymmetric loop test. It has to work by a pair of NuBAR-1000. The test is suitable for ADSL network test.

5.4 Windows of Toolbar

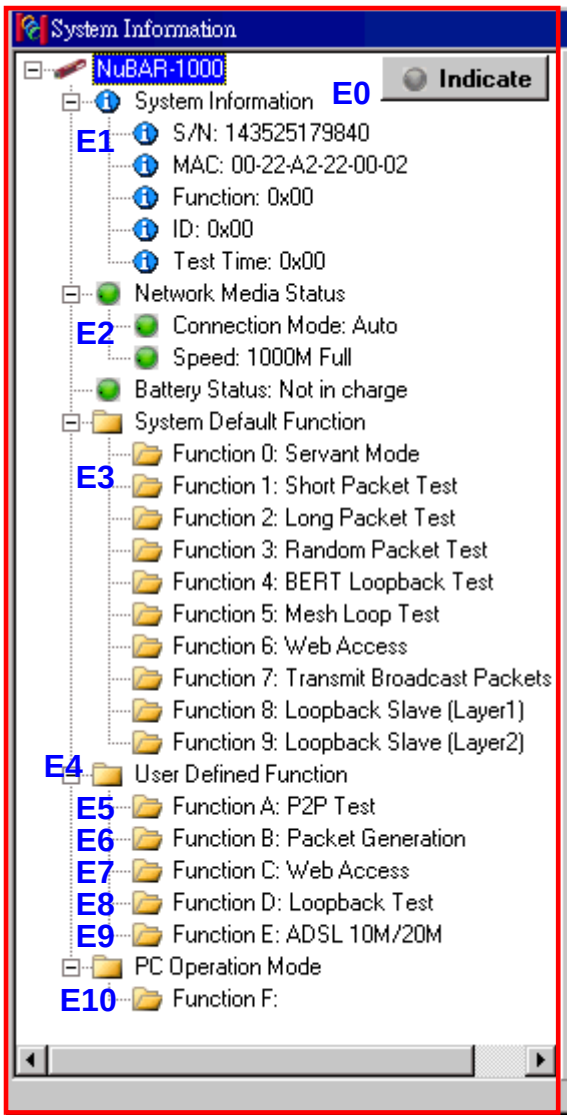
5.4.1 Configuration

Click

at Shortcut Key bar.



System Information is shown on left windows and user can click them to launch their configuration window.



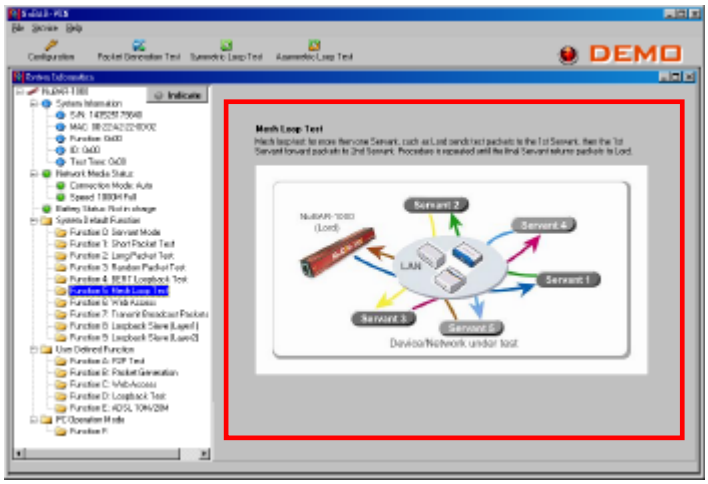
E0: Click this button to identify the controlled NuBAR-1000 that the PC connects. Press this button, all LEDs of controlled NuBAR-1000 is blinking.

E1: System information shows the related information such as Firmware version and Serial Number of this NuBAR-1000.

E2: Network Media Status shows the link speeds and duplex mode.

E3: System default function

Function 0 to 9 is the same as the Rotary Function Switch on the body of NuBAR-1000, which is not configurable from PC. However, the illustration graph at right side let user knows how these functions work. For the detail of these functions, please refer to 3.1.1 Rotary Function Switch

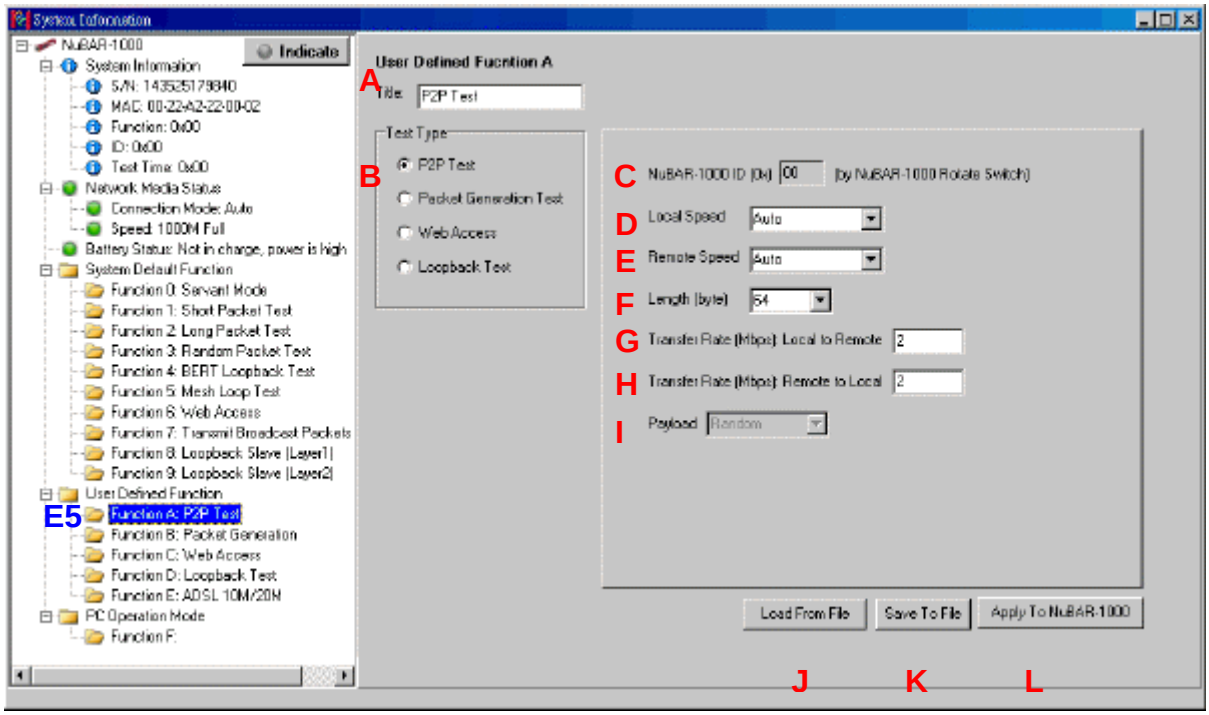


User Defined Function

E4: Five pre-defined customized settings that are operated by rotary function switch A~E.

5.4.1.1 Default User Defined Function A: P2P Test.

Position **E5**: Default User Defined Function A: P2P Test.



A: Title: Pre-defined title name, P2P Test. Users can change it by themselves.

B: Test Type

Customized test items that users can define by themselves. The detail configuration will be described below

- P2P Test: Point to point test by different speed, payload and transmission rate.
- Packet Generation Test: Test parameter for packet generation.
- Web Access: Get an IP address and download specified file from Internet for test purpose

- Loopback Test: Transmit BERT (Bit Error Rate Test) pattern for loopback test.

C: NuBAR ID

A read-only value of Current NuBAR ID, which can be tuned by NuBAR ID rotary switch on the panel of the device.

D: Local Speed: Auto or force test speed and duplex mode that generates from local side. Force mode includes 10Mbps full duplex only.

E: Remote Speed: Auto or force test speed and duplex mode that generates from remote side. Force mode includes 10Mbps full duplex only.

F: Length (bytes): The length of test packet, from 64 bytes to 1518 bytes and random

G: Transfer Rate (Mbps) Local to Remote: The transfer rate in Mbps from local to remote side

H: Transfer Rate (Mbps) Remote to Local: The transfer rate in Mbps from remote to local side. When this value is applied to Lord NuBAR-1000, the Lord NuBAR-1000 negotiates with the Servant NuBAR-1000 to transfer the test streams back to Lord NuBAR-1000.

I: Payload: Contents in hexadecimal mode carried in Ethernet frame (packet). Default is Random payload and other type of payload will created in the future.

Button

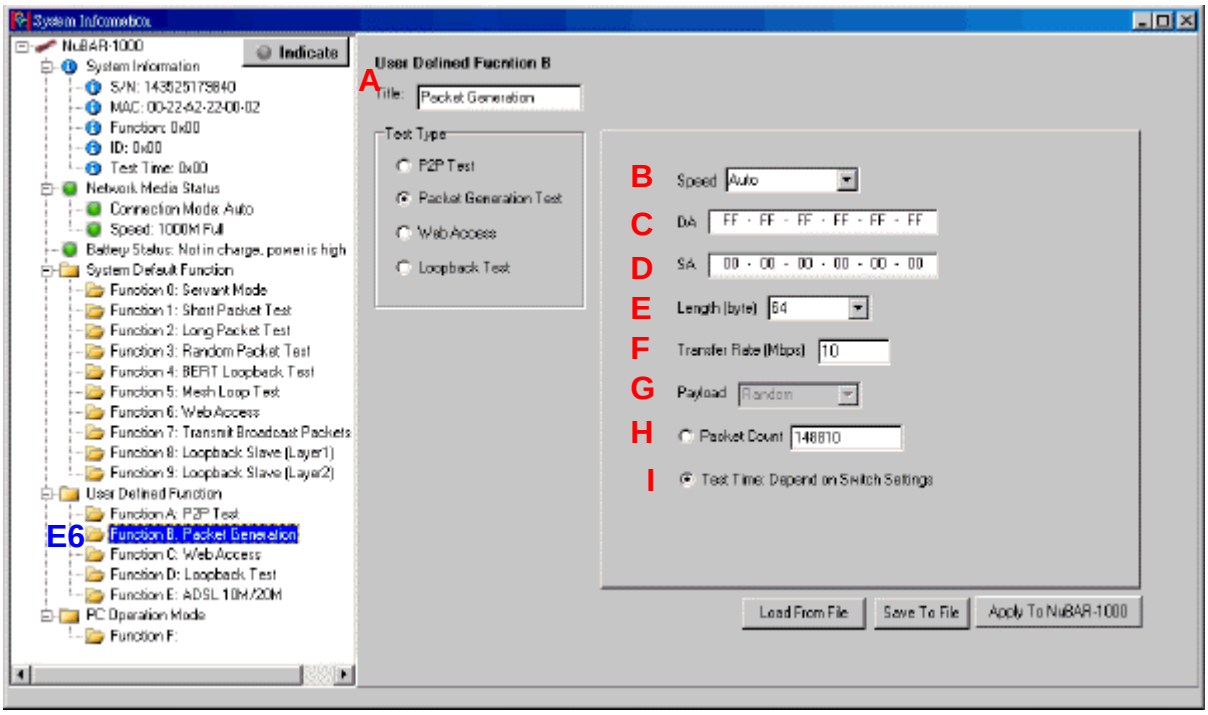
J: Load From File: Select a configuration file that is created and saved previously for the test.

K: Save to File: Save current configuration to a file. System shows the directory for user to select the location to save the file

L: Apply to NuBAR-1000: Apply these configurations to the NuBAR-1000 for offline test. Be sure that a NuBAR-1000 is connected by USB cable before this operation. Only NuBAR-1000 that acts as Lord mode is required to do this procedure. NuBAR-1000 in servant mode accepts control from Lord, so the test configuration will be passed to servant when test starts.

5.4.1.2 Default User Defined Function B: Packet Generation Test

Position **E6**: Default User Defined Function B: Packet Generation Test

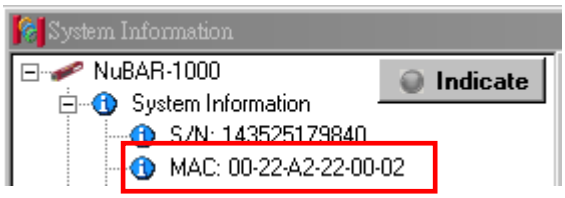


A: Title: Pre-defined title name, Packet Generation Test. Users can change it by themselves.

B: Speed: Auto or force test speed and duplex mode. Force mode includes 10Mbps full duplex only.

C: DA: Destination MAC address that the test packet will sent to.

D: SA: Source MAC address. Source MAC address of the test packet. Please configure it to the value of this NuBAR-1000, which can be acquired on System information selection or 00-00-00-00-00-00 as itself



E: Length: The length of test packet, from 64 bytes to 1518 bytes and random

F: Transfer Rate: The transmission throughput in Mbps

G: Payload: Contents in hexadecimal mode carried in Ethernet frame (packet). Default is Random payload and other type of payload will created in the future

Packet Count / Test Time

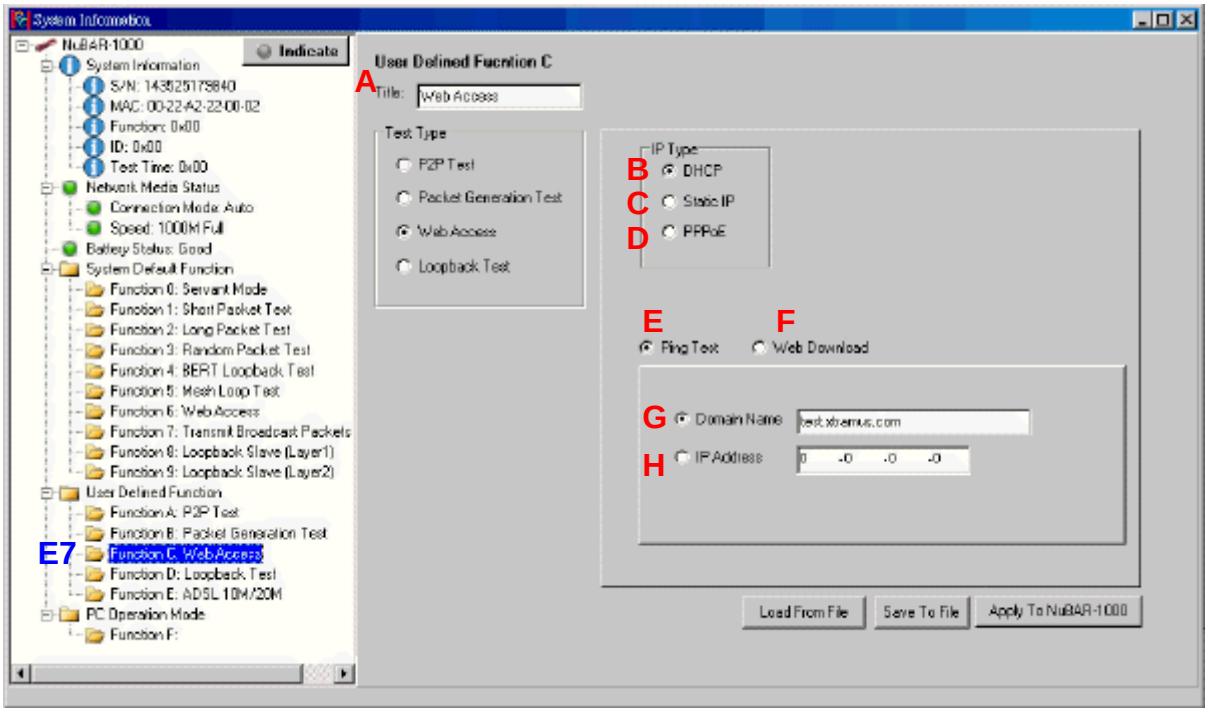
Select either one of them to generate test packet.

H: Packet Count: Input a value for the packet generation procedure. When the packets counts generated reach the configured value here, the generation procedure stops.

I: Test Time: Please configure test duration by the rotary switch on the body of NuBAR-1000

5.4.1.3 Default User Defined Function C: Web Access

Position **E7**: Default User Defined Function C: Web Access

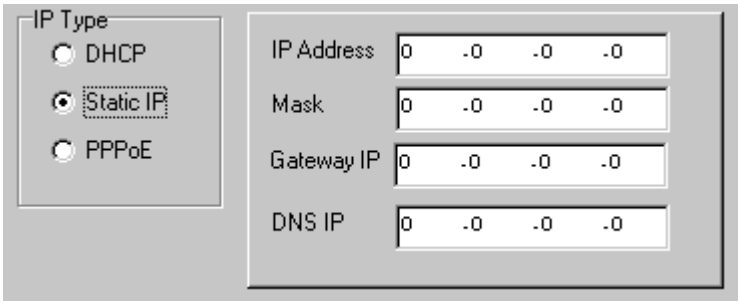


A: Title: Pre-defined title name, Web Access. Users can change it by themselves.

IP Type: The method to get the IP information

B: DHCP: Get IP information from DHCP server

C: Static IP: Use static IP to access the internet. When this selection is ticked. A form of IP information is shown at right side. Please input related static IP information

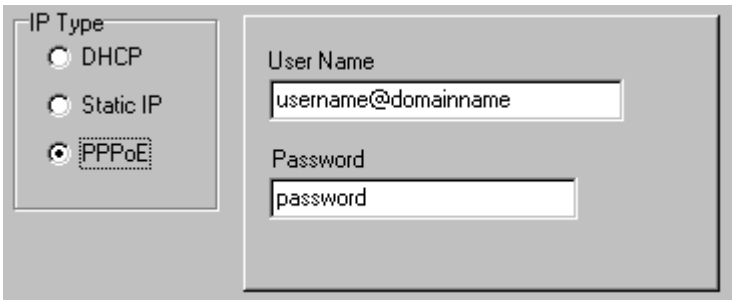


D: PPPoE

PPPoE, Point-to-Point Protocol over Ethernet, is a network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. It is used mainly with ADSL services where network device of individual users connect to the ADSL transceiver (modem) over Ethernet in plain Metro Ethernet networks.

NuBAR-1000 tries to connect to DSLAM by PPPoE (Point-to-Point Protocol over Ethernet) protocol.

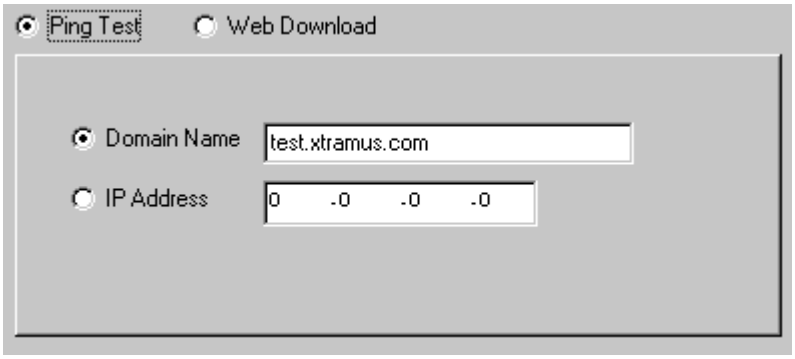
User Name and Password is required for authentication. When this selection is checked. A form of authentication information is shown at right side. Please input User Name and Password of the ISP (Internet Service Provider) for authentication



Type of Internet Test. Select a test type

E: Ping Test: Ping Test: Ping is a network tool used to test whether a particular host is reachable across an IP network. It is also used to self-test the network interface card of the computer, or as a speed test. It works by sending ICMP “echo request” packets to the target host and listening for ICMP “echo response” replies.

When Ping Test is ticked:



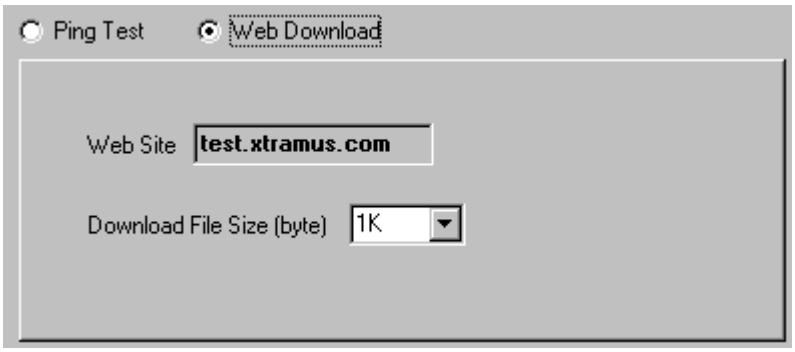
G: Domain Name: Default domain name is test.xtramus.com. User can input their own target domain for ping test

H: IP Address: Select either one between Domain Name and IP Address for ping test.

F: Web Download:

Download specified test file from Xtramus test site in Internet

When Web download is ticked:

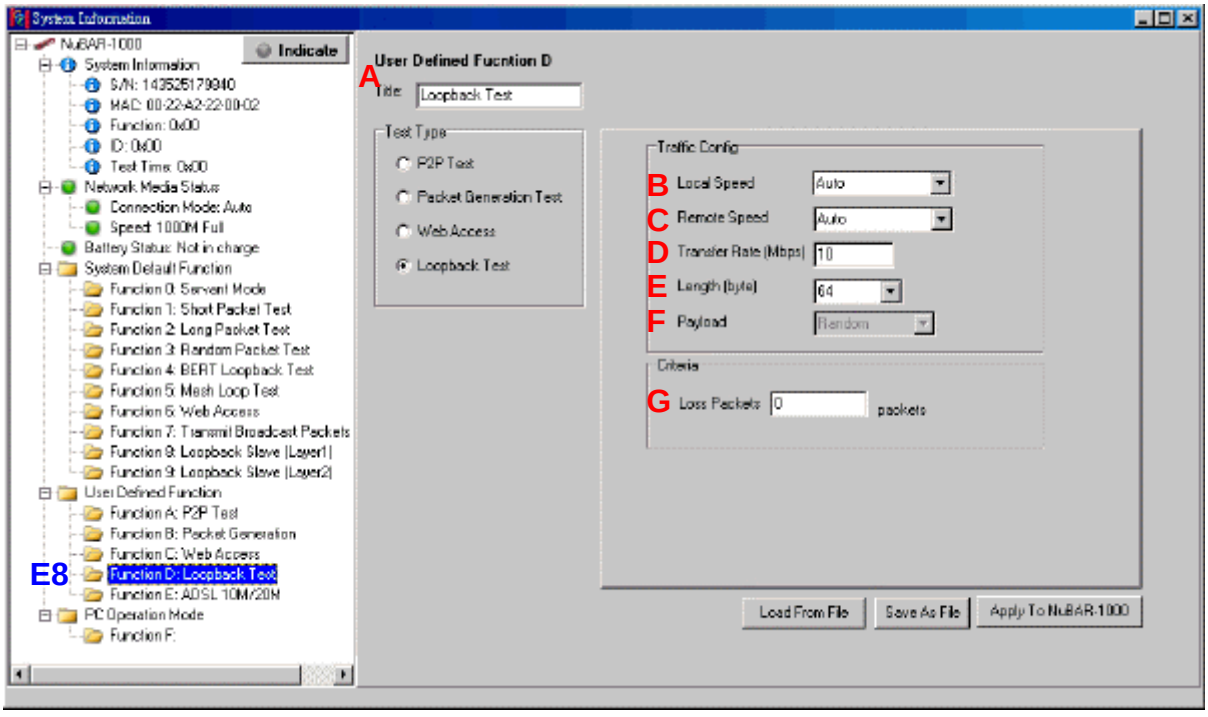


Size of test file is selectable.

Note: Please be caution that download large size file take longer operation time. Make sure that the battery is fully charged or powered by external adapter to avoid download failure.

5.4.1.4 Default User Defined Function D: Loopback Test

Position **E8**: Default User Defined Function D: Loopback Test



B: Local Speed: Auto or force test speed and duplex mode that generates from local side. Force mode includes 10Mbps full duplex only.

C: Remote Speed: Auto or force test speed and duplex mode that generates from remote side. Force mode includes 10Mbps full duplex only.

D: Transfer Rate: The transmission throughput in Mbps

E: Length: The length of test packet, from 64 bytes to 1518 bytes and random

F: Payload: Contents in hexadecimal mode carried in Ethernet frame (packet). Default is Random payload and other type of payload will created in the future

Criteria

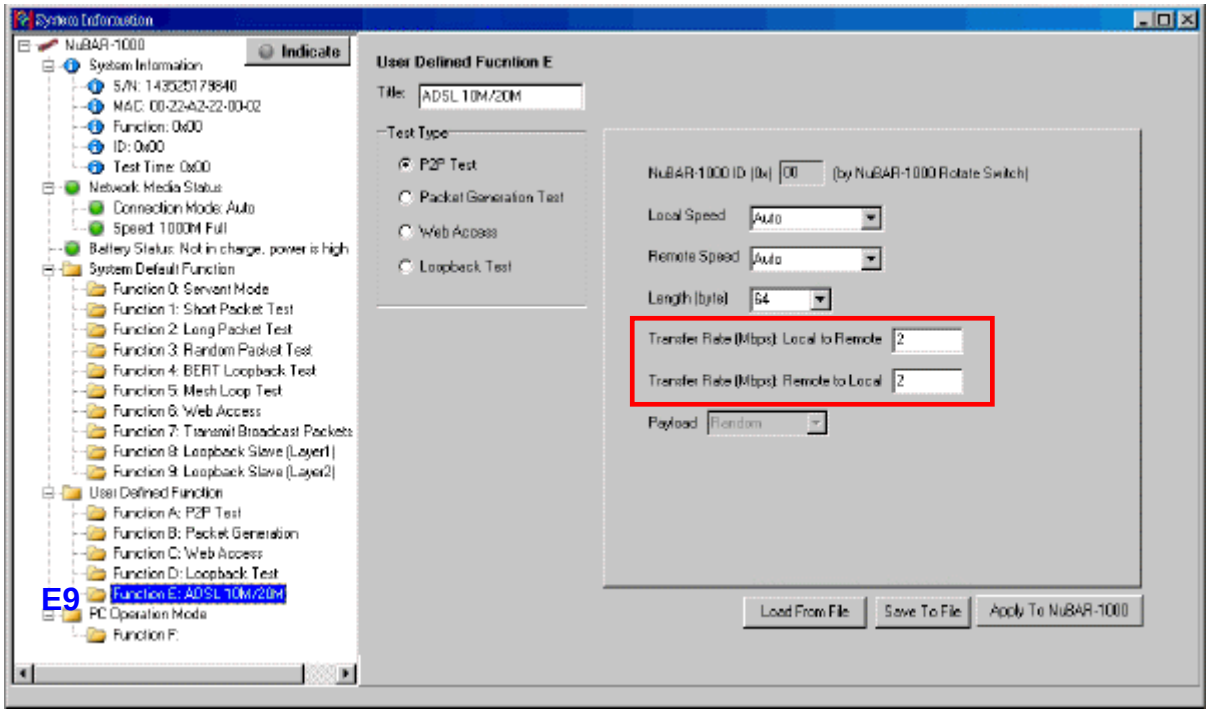
G: Loss Packets _____ packets

If loss packet counts are beyond the criteria configured here, the test is failed.

5.4.1.5 Default User Defined Function E: ADSL 10M/20M

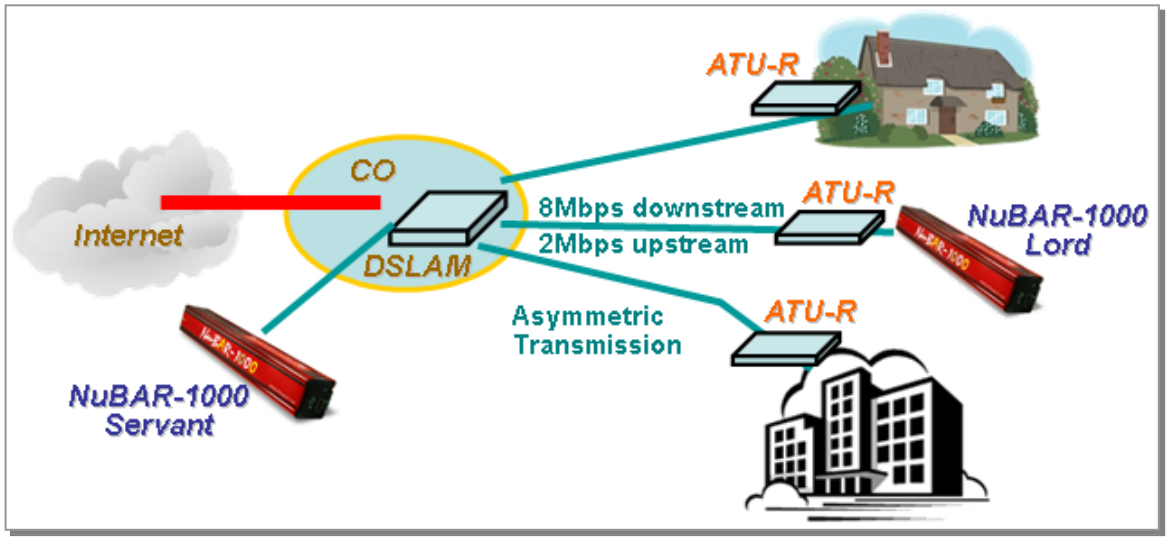
Location **E9**: Default User Defined Function E: ADSL 10M/20M

This function is the same as **E5** P2P test. Tune the Transfer rate between local and remote site, then operator can has parameter of ADSL that the transfer speed is not symmetric.



Local vs. Remote

The configuration of transmission between Lord and Servant can be different that is quite useful for test on ADSL transmission. Locate servant NuBAR-1000 at the port of DSLAM in central office and take the lord NuBAR-1000 to do the on-site test.

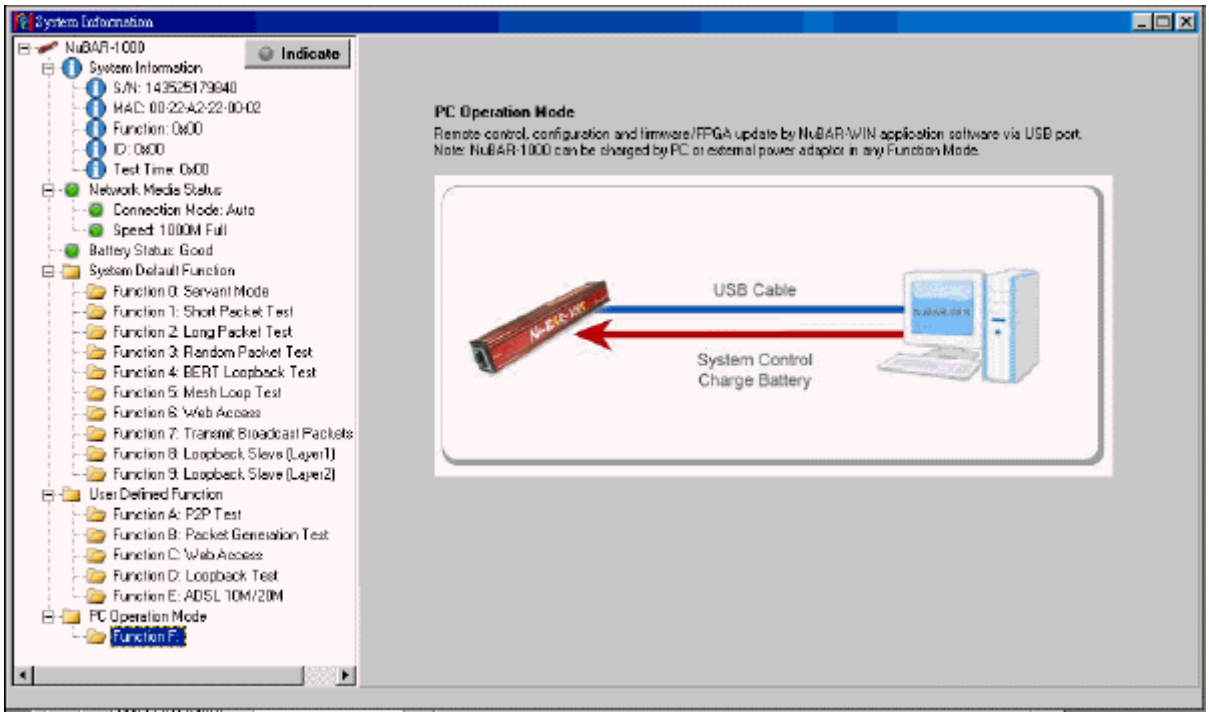


Test ADSL by NuBAR-1000

5.4.1.6 PC Operation Mode

Location **E10**: PC Operation Mode: Function F

Rotate the rotary function switch to function F for connection and configuration from PC. The graph at right part of the windows is for illustration only.



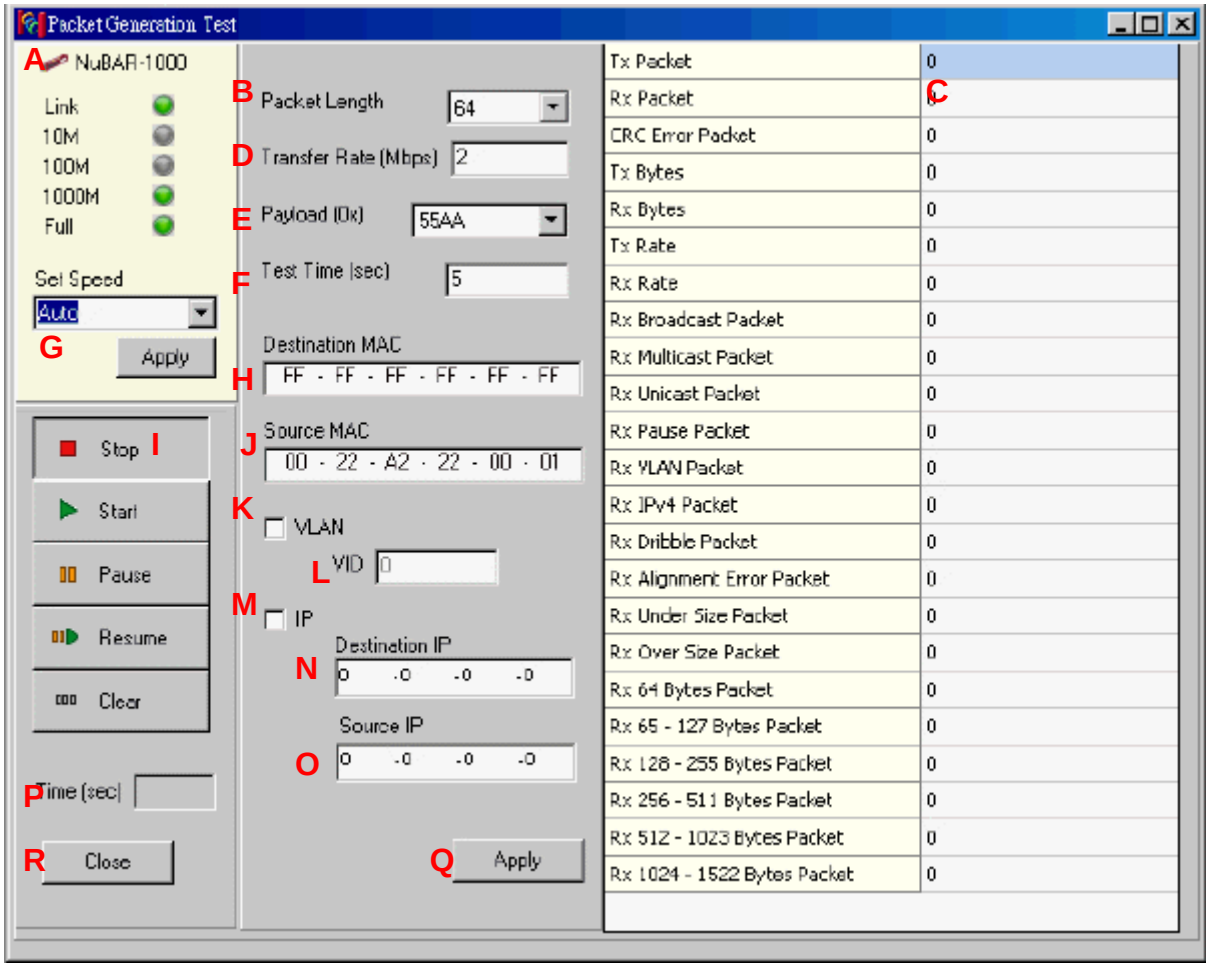
5.4.2 Packet Generation

Click

at Shortcut Key bar.

Configure parameter of Packet Generation Test. To operate this test mode, PC is required to

connect the NuBAR-1000 and click the operation buttons on the screen to process the operation.



A: Network Status:

The connection status of this NuBAR-1000

Item	Indicator	Description
Link	ON	Network is linked up.
	OFF	Network is linked down.
10M	ON	Connection in 10Mbps mode
	OFF	Non-10Mbps connection mode. Please refer to other indicator
100M	ON	Connection in 100Mbps mode
	OFF	Non-100Mbps connection mode. Please refer to other indicator
1000M	ON	Connection in 1000Mbps (1Gbps) mode
	OFF	Non-1000Mbps connection mode. Please refer to other indicator
Full	ON	Connection in full duplex mode
	OFF	Connection in half duplex mode if Link indicator is ON

G: Set Speed

Auto or force test speed and duplex mode. Force mode includes 10Mbps full duplex only. Click Apply to take effect the settings

I: Control button: Control the test procedure

- Stop: Stop Packet Generation
- Start: Start Packet Generation
- Pause: Pause the procedure
- Resume: Resume to original procedure
- Clear: Clear all counter for next test

P: Time (sec): Duration of ongoing test

B: Packet Length: packet length available for the test, from 64 to 1518 bytes, plus random length selections

D: Transfer Rate (Mbps): The transmission throughput in Mbps. Please input value that fit the real network environment; otherwise, packet loss would happen.

E: Payload(0x): Contents in hexadecimal mode carried in Ethernet frame (packet). In the selections

- Fixed value: 0000, FFFF, 5A5A, 55AA, 0F0F, 00FF. These values are repeated continually until the end of the test
- Byte increase: Byte of payload in frame is increasing
- Random: The payload contents are generated randomly by the device.
- BERT: Bit Error Rate Test is a testing method for digital communication circuits that uses predetermined stress patterns comprising of a sequence of logical ones and zeros generated by a pseudorandom binary sequence.

F: Test Time (sec): Test duration of a single test.

H: Destination MAC: Destination MAC address that this NuBAR-1000 will transmit packet for test.

I: Source MAC: Source MAC address. It should be the MAC address of this NuBAR-1000

K: VLAN: Tick to add VLAN tag in the packet (frame). When this option is selected, specify
L: VID (VLAN ID) for the VLAN tag.
M: IP: IP address in IP header of payload in Ethernet packet (frame)
N: Destination IP: Destination IP address of the packet
O: Source IP: Source IP address of the packet. It should be the IP address of this NuBAR-1000 itself.

Q: Apply (button). Click it to take effect all configurations.

R: Close (button). Click it to close this window.

C: Counter:

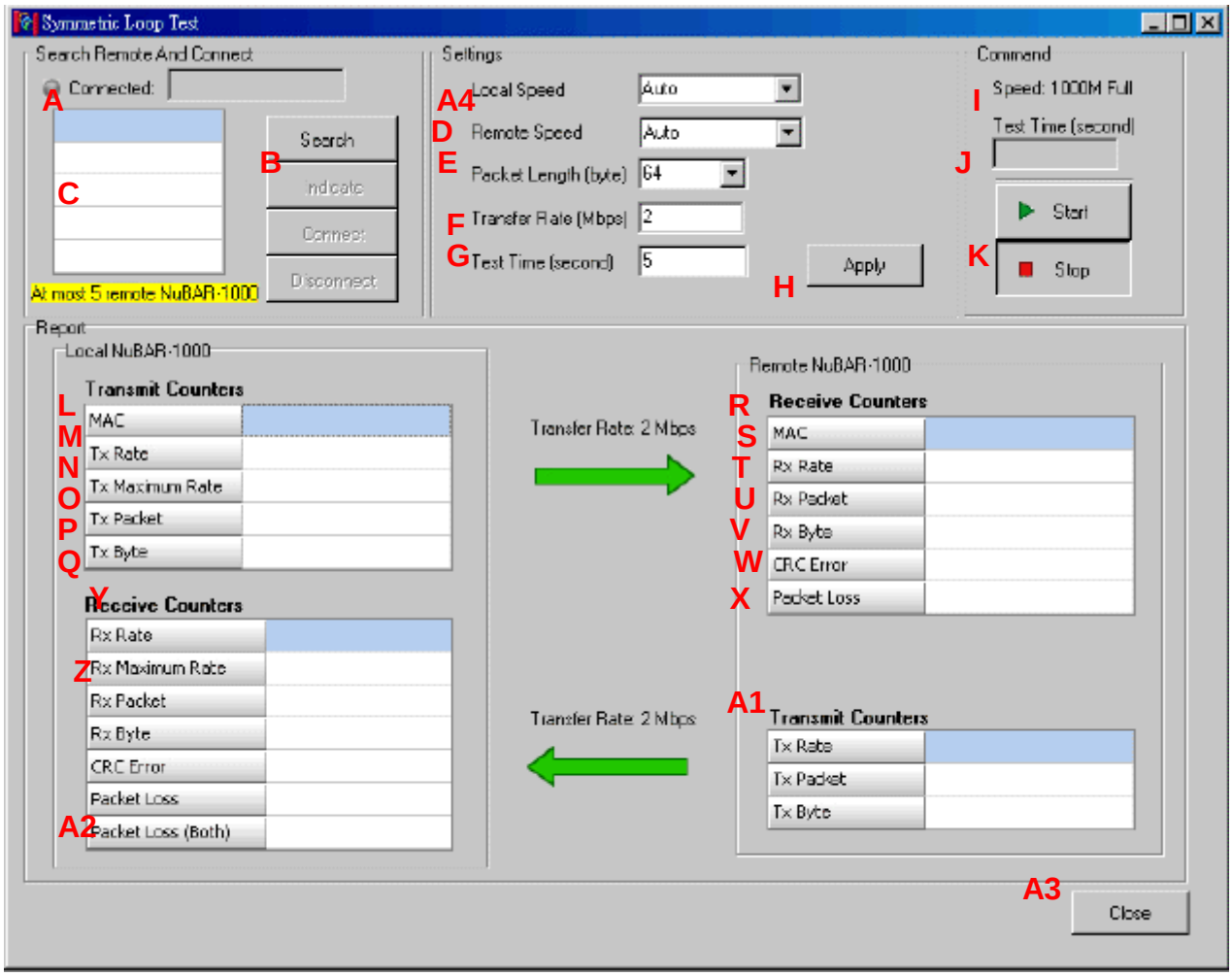
Counter Item	Description
Tx Packet	Packets counts sent
Rx Packet	Packets counts received
CRC Error Packet:	Counts of received CRC error packets
Tx Bytes	Total bytes sent.
Rx Bytes	Total bytes received
Tx Rate	Transmission rate in percentage
Rx Rate	Receiving rate in percentage
Rx Broadcast Packet	Counts of received broadcast packets
Rx Multicast Packet	Counts of received multicast packets
Rx Unicast Packet	Counts of received unicast packets
Rx Pause Packet	Counts of received pause packets
Rx VLAN Packet	Counts of received packets with VLAN tag
Rx IPv4 Packet	Counts of received packets with IPv4 header in payload of frame (packet)
Rx Dribble Packet	Counts of received dribble error packets
Rx Alignment Error Packet	Counts of received alignment error packets
Rx Under Size Packet	Counts of received under size (<64 Kbytes length) packets
Rx Over Size Packet	Counts of received over size (>1518 Kbytes length) packets
Rx 64 Bytes Packet	Counts of received frames that are 64 bytes length
Rx 65 -127 Bytes Packet	Counts of received frames that are between 65 and 127 bytes length
Rx 128 -255 Bytes Packet	Counts of received frames that are between 128 and 255 bytes length
Rx 256 -511 Bytes Packet	Counts of received frames that are between 256 and 511 bytes length
Rx 512 -1023 Bytes Packet	Counts of received frames that are between 512 and 1023 bytes length
Rx 1024 -1522 Bytes Packet	Counts of received frames that are between 1024 and 1522 bytes length

5.4.3 Symmetric Loop Test

Click

at Shortcut Key bar.

Lord NuBAR-1000 negotiates with Servant NuBAR-1000 by the configuration below and do symmetric loop test.



A: Connected: MAC address of current connected servant NuBAR-1000

B: Several buttons for the mapping of remote Servant NuBAR-1000

- Search (button): Click this one to search all NuBAR-1000 available in the Ethernet. NuBAR-1000 that is deployed under layer 2 (MAC address based) Ethernet structure should be found.
- Indicate: Click a NuBAR-1000 listed at left window and this button to identify the controlled NuBAR-1000. All LEDs of controlled NuBAR-1000 is blinking if this button is pressed.
- Connect: Click a NuBAR-1000 listed at left window and this Connect button to link with.
- Disconnect: Click a NuBAR-1000 listed at left window and disconnect it. If user disconnect a NuBAR-1000 that you had not connected. System prompts user an error message.

C: NuBAR-1000 that are found in the network after search by pressing Search button.

A4: Local Speed: Auto or force test speed and duplex mode that generates from local side. Force mode includes 10Mbps full duplex only.

D: Remote Speed: Auto or force test speed and duplex mode that generates from remote side.

Force mode includes 10Mbps full duplex only.

E: Packet Length: packet length available for the test, from 64 to 1518 bytes

F: Transfer Rate (Mbps): The transmission throughput in Mbps. Please input value that fit the real network environment; otherwise, packet loss would happen.

G: Test Time (second): Test duration of a single test.

H: Apply: Click to take effect the configuration

Command

I: The default test speed is 1000Mbps Full

J: Test Time (second): The duration in seconds that is going on currently. The parameter of duration can be configured at the time rotary switch on the panel of NuBAR-1000.

K: Button to control the procedure

- Stop (button): Stop the test. If Test Time (second) is configured. Wait the system to stop the test automatically, otherwise, force to stop the test immediately get the failed test result.
- Start (button): Start the test.

L: Transmit Counter from Lord NuBAR-1000 in symmetric loop test.

M: MAC: MAC address of Lord NuBAR-1000

N: Tx Rate: Transfer rate of ongoing test stream.

O: Tx Maximum Rate: Maximum transfer rate of ongoing test stream.

P: Tx Packet: Transmitted packet counts

Q: Tx Byte: Transmitted data bytes.

R: Received Counter at Servant NuBAR-1000 in symmetric loop test.

S: MAC: MAC address of Servant NuBAR-1000

T: Rx Rate: Receive rate from ongoing test stream generated from Lord NuBAR-1000.

U: Rx Packet: Received packet counts

V: Rx Byte: Received data bytes.

W: CRC Error: CRC error packet counts found from received packet

X: Packet Loss: Packet loss counts found in received packets.

A1: Transmit Counter from Servant NuBAR-1000 to Lord NuBAR-1000 in symmetric loop test.

- Tx Rate: Transfer rate of ongoing test stream.
- Tx Packet: Transmitted packet counts

- Tx Byte: Transmitted data bytes.

Y: Received Counter at Lord NuBAR-1000 that is transmitted from Servant NuBAR-1000 in symmetric loop test.

- Rx Rate: Receive rate from ongoing test stream generated from Servant NuBAR-1000.
- **Z**: Rx Maximum Rate: Maximum receive rate from ongoing test stream generated from Servant NuBAR-1000.
- Rx Packet: Received packet counts
- Rx Byte: Received data bytes.
- CRC Error: CRC error packet counts found from received packet
- Packet Loss: Packet loss counts found from Servant to Lord.
- **A2**: Packet Loss (Both): Packet loss counts found from both Lord to Servant and Servant to Lord.

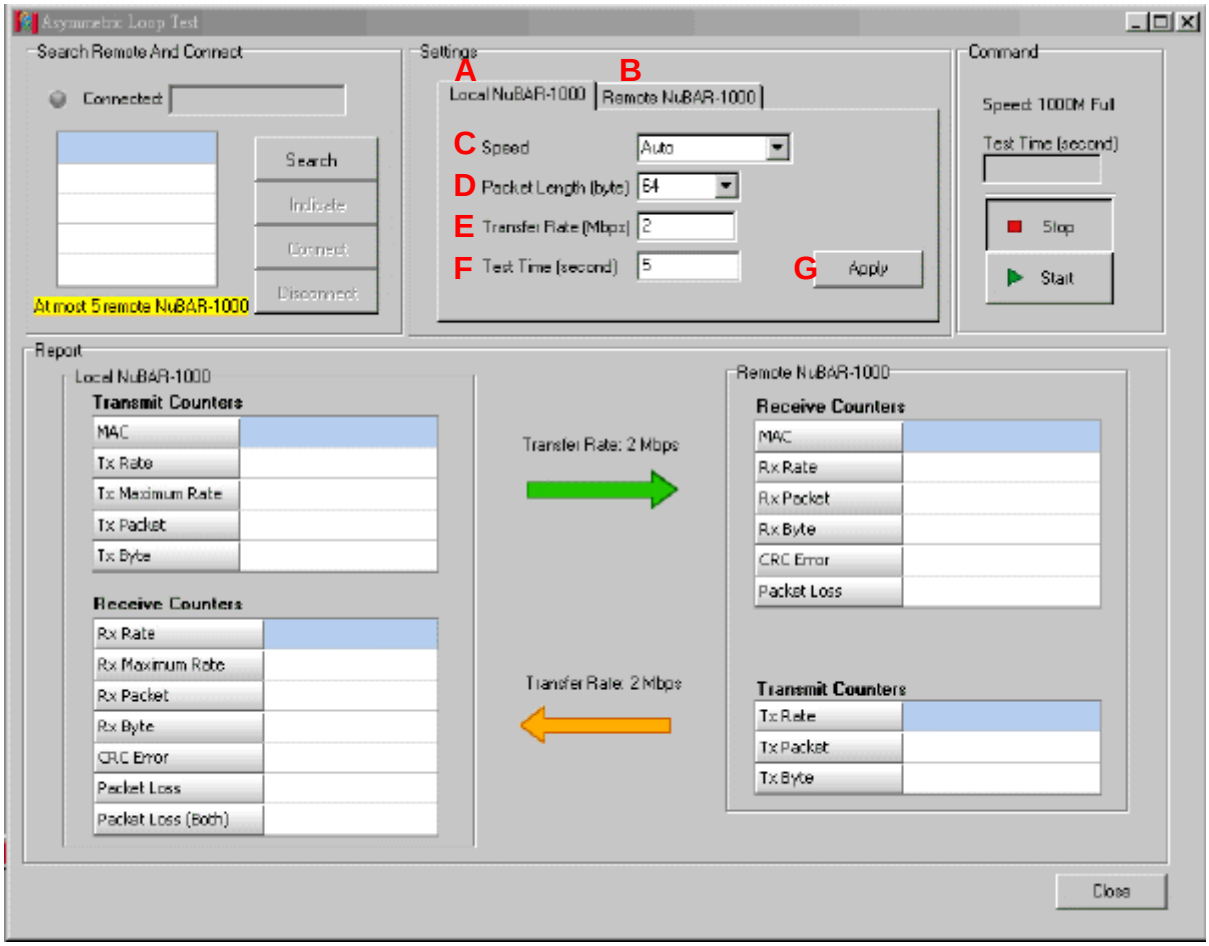
A3: Close this Window

5.4.4 Asymmetric Loop Test

Click

at Shortcut Key bar.

For the symmetrical loop test above, Lord and Servant send symmetrical test stream to each other for the test. For this asymmetric loop, the test stream and transfer rate between local Lord NuBAR-1000 and remote Servant NuBAR-1000 is different.



A: Local NuBAR-1000

The setting is the same as Symmetric Loop Test

C: Speed

Auto or force test speed and duplex mode. Force mode includes 10Mbps full duplex only.

D: Packet Length: packet length available for the test, from 64 to 1518 bytes

E: Transfer Rate (Mbps): The transmission throughput in Mbps. Please input value that fit the real network environment; otherwise, packet loss would happen.

F: Test Time (second): Test duration of a single test.

G: Apply: Click to take effect the configuration

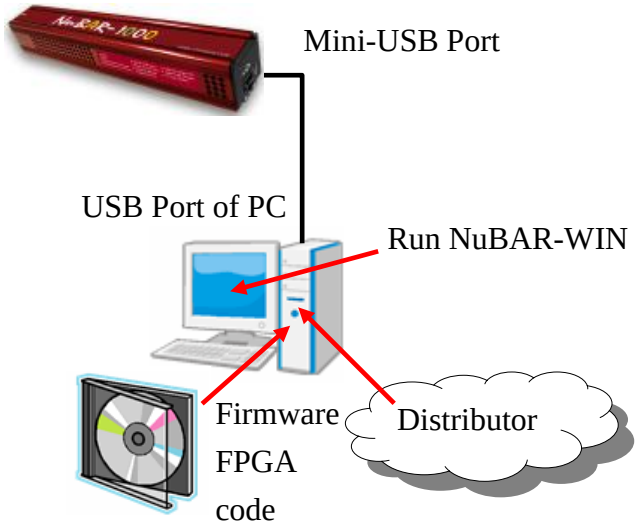
B: Remote NuBAR-1000

It has the same configuration item as Local (Lord) NuBAR-1000, except Test Time. There is no Test Time for Remote NuBAR-1000. It synchronizes with Local NuBAR-1000.

6. Maintenance

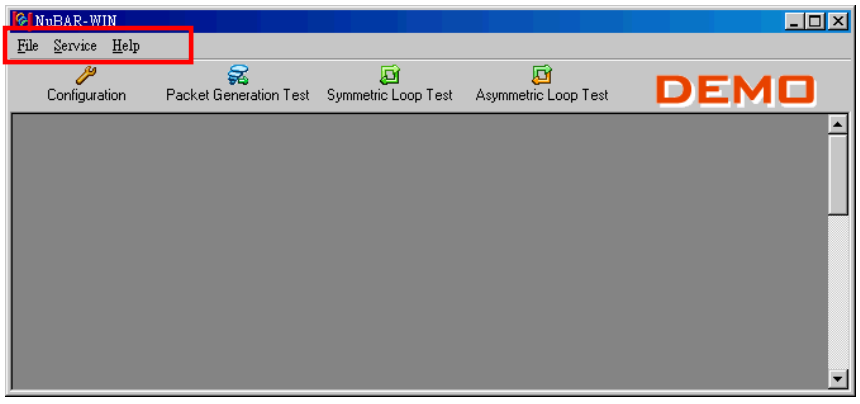
6.1 Upgrade Firmware and FPGA

For function improvement or solved bug, it may have new version of firmware or FPGA. Operator can upgrade this machine via mini-USB port. Before firmware/FPGA upgrade, install USB driver and utility software of NuBAR-1000 is required. Please refer to previous chapter 5 Remote Control from USB Port

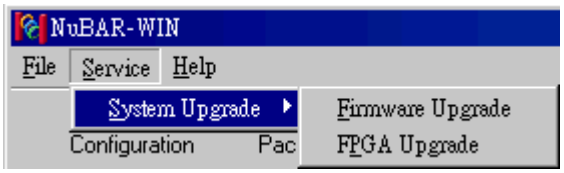


Upgrade procedure

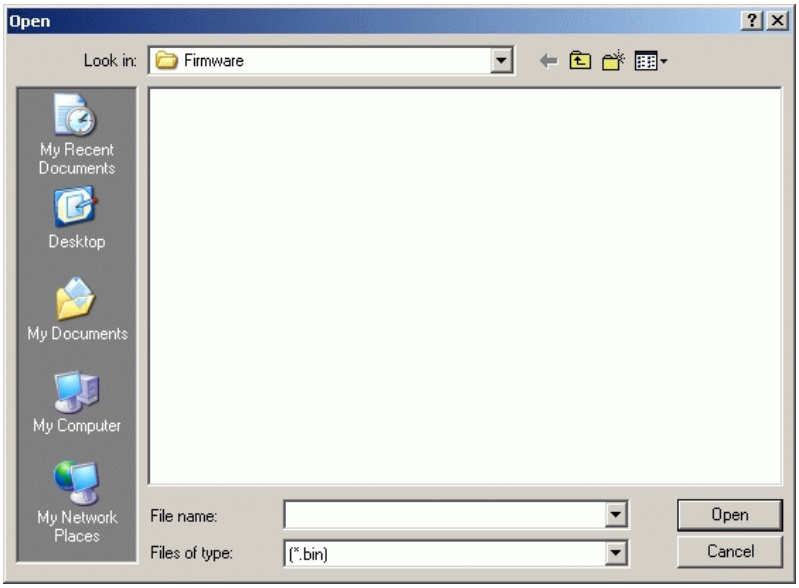
1. Click to start utility and system shows the Windows below



2. Select **Service → System Upgrade → Firmware Upgrade / FPGA Upgrade**



3. Select the upgrade file for this machine and then click **Open**



4. Follow the instruction to finish the upgrade procedure.
5. Unplug and then plug power jack to restart this machine.
6. Repeat procedure and select **FPGA Upgrade** to upgrade FPGA

6.2 Built-in Battery

6.2.1 Replacement of Battery

There are two built-in NI-MH batteries for the operation of NuBAR-1000
Please pay attention to the notice below.

- They are charged by USB cable via PC or external adapter in the NuBAR-1000 package.
- They are advised to be replaced by authorized Xtramus technicians once operation time is short obviously. Please contact with distributor for the replacement of battery. Remove the warranty label and replace battery by yourself will lose warranty.

6.2.2 Charge and Operation Time of Battery

Fully charge is required for a chargeable fresh new battery that is pre-installed in the NuBAR-1000. The charge and operation time is illustrated below

- Battery charge time

Charge Device	Charge Time
Attached external adapter	420 minutes if power is exhausted

- 1000 Mbps Gigabit Ethernet mode

Utilization	Operation Time of Fresh Battery
100%	100 minutes
10%	110 minutes

- 100 Mbps Fast Ethernet mode

Utilization	Operation Time of Fresh Battery
100%	200 minutes
10%	220 minutes

- 10 Mbps Ethernet mode

Utilization	Operation Time of Fresh Battery
100%	180 minutes
10%	205 minutes

6.3 Restriction of Operation

NuBAR-1000 is not designed for network products mass production line. It is a network debugging/troubleshooting device for network wiring or deployment.

Using NuBAR-1000 for a long period of time will cause its aluminum case extremely hot, and might cause hardware malfunctions and burning sensations for the users.

It is recommaned not to use NuBAR-1000 for more than 4 hours under room temperature, especially when it is operatinig in Wirespeed transmitting/receiving.